ADDENDUM TO RFP DOCUMENTS

SOLANO COMMUNITY COLLEGE	ADDENDUM #01
	SCCD RFQP: #23-001
	Project: Substation #3 & #4 Replacement Solano Community College District
	Date: 8/17/2022

Addendum # 01 – The following clarifications are provided based on questions received and must be added/considered when completing your submittal: Acknowledgement of receipt of this ***ADDENDUM*** is required in the proposal's cover letter of introduction. Please clearly note the addendum date and number.

ITEM:

1. Misc. grammatical revisions were incorporated to reflect consistent naming convention in RFQP (i.e. changes to abbreviation 'RFQP' where appropriate
2. DSA submittal expertise and experience was added to qualifications evaluation
3. Conflict was addressed in project requirements section on page 14 of RFQP packet, and page 55/91 on of contract terms liquidated damages. Correct values are:
    a. Liquidated damages are in the amount of three thousand five hundred dollars ($3,500) for each calendar day that the project extends beyond the substantial completion date, and one thousand five hundred dollars ($1,500) for each calendar day that the project extends beyond the final completion date.
4. Additional evaluation factors were added in RFP section of RFQP packet starting on page 16:
    a. Technical Proposal
        i. Materials and systems proposed conformance to campus standards as well as industry standards
        ii. Adequate provisions for access and maintenance
        iii. Adequate provisions for future expansion
    b. Implementation Plan & Schedule
        i. Adequate provisions to accommodate and minimize downtime and impact to campus
5. Section 1.33 of Contract Terms document amended to delete reference to Appendix H (not applicable to project)
6. Section 9.3.1 of Contract Terms document amended to delete reference to Appendix A1

(not applicable to project)

7. Section 11.2.2.1.2 & 11.2.2.1.3 of contract terms updated to reflect allowable markup cost
8. Section 15.1.9 of contract terms updated to reflect contractor insurance policy limit requirements
9. DB Performance Criteria documents appendices sheet updated to include supplemental specifications for Division 26. District standards replaced balance of specifications and have been included in the updated consolidated RFQP bid package:
    a. 26 13 16-13 Switchgear MV LI
    b. 26 24 13-11 LV Switchboard
    c. 26 11 16-11 Unit Substations
    d. 26 12 13 MV Transformer Liquid Filled
    e. District Standard Provided
10. Updated Substation Bridging Documents to 8/16/22 set

For ease of navigation, all RFQP documents have been packaged in a consolidated bookmarked file with this addendum.

SOLANO COMMUNITY COLLEGE DISTRICT

REQUEST FOR QUALIFICATIONS/PROPOSAL

RFQP # 23-001

Design-Build Services, Substation #3 and #4 Replacement Project

NOTICE IS HEREBY GIVEN that the Solano Community College District ("District") is seeking to qualify design-build entities or design-build teams to concurrently submit Statements of Qualifications (SOQ's) & Proposals to design and construct the District's Substation #3 and #4 Replacement Project ("Project"), in accordance with Education Code section 81700 et seq. Only respondents who meet the qualifications outlined within this solicitation that have been shortlisted by the District in response to this Request for Qualifications ("RFQ") will have their subsequent response to the Request for Proposals ("RFP") opened. Proposals from respondents that are not shortlisted will be returned unopened.

Respondents to this RFQP shall submit a fully completed Statement of Qualifications ("SOQ") & Proposal using the District's standard prequalification template for design-build projects, as further described herein.

ALL RESPONSES ARE DUE BY 2:00 P.M. ON WEDNESDAY SEPTEMBER 28th, 2022.

Deliver through the following ways:

I. BY MAIL OR HAND DELIVERED to:

Solano Community College District
4000 Suisun Valley Road, Building 1102
Fairfield, CA 94534
ATTN: Kristoffer Bridges
RFQP # 23-001

Oral, telegraphic, facsimile, email, or telephone SOQ's/Proposals will not be accepted. SOQ's/Proposals received after this date and time will not be accepted and will be returned unopened.

District reserves the right to waive irregularities and omissions in the information contained in any SOQ's/Proposals , and to make all final determinations. District may use other sources of information outside of the SOQ's/Proposals to investigate respondents or to verify answers.

Each SOQ/Proposal must be certified under penalty of perjury by the respondent. If any information provided by a respondent becomes inaccurate, the respondent must immediately notify District and provide updated, accurate information in writing, under penalty of perjury. District reserves the right to suspend or rescind prequalification or shortlisted firms at any time based on subsequently learned information.

Questions regarding this RFQ/P may be directed in writing to the Project Manager, Kristoffer Bridges, at Kristoffer.Bridges@solano.edu and must be submitted on or by **2:00 P.M. Wednesday , September 7th, 2022.**

The RFQ/P documents, including addenda, are available through the District's website.

http://www.solano.edu/measureq/vendor.php

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All tabs have been hyperlinked

REQUEST FOR QUALIFICATIONS

I. RFQP SCHEDULE SUMMARY

The District may change the dates on this schedule without prior notice.

DEADLINE	ACTION ITEM
Wednesday, August 17th, 2022	Release of RFQP.
Monday, August 29th , 2022 @ 11:00 AM	Mandatory Virtual Webinar
Tuesday, August 30th, 2022 @ 10:00 AM	Mandatory Pre-Proposal Site Walk
Wednesday, September 7th, 2022, at 2:00 P.M.	Last day to receive written questions from respondents.
Wednesday, September 14th, 2022, at 2:00 P.M	Last day for District to issue addenda or answer questions.
Wednesday, September 28th, 2022, at 2:00 P.M	Deadline for submissions of RFQP.
Thursday, October 6th, 2022	Notice to shortlisted respondents.
October 11th & 12th	DBE Interviews
Monday, October 17th, 2022	Select Firm for Negotiations
October/November 2022	Vendor Contract Negotiations
Friday, November 4th, 2022	Deadline for SCCD board meeting agenda item submittal
Wednesday, November 16th, 2022	SCCD Board Meeting for Approval of Contract
November 2022 – May 2023	Design, Engineering, and DSA Approval.
June 2023 – September 2024	Construction of System

II. PROJECT DESCRIPTION AND SCOPE OF SERVICES

Pursuant to Education Code section 81700 et seq., the District is seeking a design-build entity or team ("DBE") to design and construct the District's **Substation #3 and #4 Project** ("Project"). The Project is further defined in the attached **APPENDIX A**, along with the District's expected cost range and schedule for the Project. The District's performance specifications, which the selected DBE must adhere to in delivering the Project, are made available concurrently to DBE respondents for the RFP portion of the submittal. While submissions for both RFQ and RFP are due simultaneously, respondents shall submit the packages in separate envelopes. DBE's will be notified of shortlist status, and only the RFP envelopes of the selected parties will be opened.

The selected DBE must be appropriately licensed and registered in the State of California for architectural, engineering, and construction services as needed to complete the Project. In addition, the selected DBE shall have experience with both design and construction of public-school facilities and in working with the California Community Colleges Chancellor's Office ("CCCCO"), the Division of the State Architect ("DSA"), and Title 24 of the California Code of Regulations.

Any contractor from the selected DBE must be registered with the Department of Industrial Relations ("DIR") as required by law. The selected DBE will be required to comply with the Labor Code prevailing wage requirements and the District's bonding and insurance requirements. The selected DBE shall be required to work cooperatively with District staff, the Board of Trustees, all other technical consultants, the criteria architect, the project inspector, and any program and/or construction manager, if any, retained by the District for the Project, citizens' oversight committee, other District committees, and the community to facility timely and professional completion of the Project.

All vendors (firm/company/contractor) should follow the Solano County Health Department's mandated COVID-19 workplace safety and health guidelines. Workers working under the Contract shall comply with all 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. Vendors shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Work.

III. DESIGN-BUILD PROCUREMENT PROCESS

Pursuant to Education Code section 81703, procurement of a DBE will follow two (2) phases:

1. Prequalification – First, by this RFQ, the District shall qualify and shortlist up to five (5) highest scoring respondents using a standard template request for statements of qualifications, as outlined in **Appendix B**. The significant factors the District reasonably expects to consider in evaluating qualifications are identified in Section VIII, below.

   A design-build entity shall not be qualified or shortlisted unless the entity provides an enforceable commitment to the community college district that the entity and its subcontractors at every tier will use a skilled and trained workforce to perform all work on the project or contract that falls within an apprenticeable occupation in the building and construction trades, in accordance with Chapter 2.9 (commencing with Section 2600) of Part 1 of Division 2 of the Public Contract Code.

2. Design-Build Competition – Second, the District is concurrently issuing an RFP, by which a maximum five (5) shortlisted, qualified respondents competitive **sealed** proposals for the Project will be assessed. The District will use a **best value selection method** for evaluating proposals. The procedure for final selection will be as follows:

   a. The District will evaluate responsive proposals using only the criteria and selection procedures specifically identified in the RFP.

   b. At a minimum the request for proposal process will include the following components:

      (1) Technical Expertise – Written narratives to demonstrate experience and capability with design and construction of like-projects, considering only design-build experience and California school design and construction experience.

      (2) Proposed project schedule, including design and construction phases.

      (3) Safety record – DBE's proposed safety plan and experience modification rate and average total recordable injury/illness rate meet the requirements of Education Code section 81703, subdivision (c)(2)(G).

      (4) Price Proposal - Including design costs, construction fee, general conditions costs, mark-up, insurance, and bonds.

      (5) Organization of RFP, insurance adherence, acknowledgment of the form of agreement, and certifications.

      (6) Participation in an interview/proposal presentation after submission of the RFP.

c. The District may, at its discretion, request proposal revisions and hold discussions and negotiations with responsive proposers. The RFP will define applicable procedures to ensure that discussions or negotiations are conducted in good faith.

d. The District will rank responsive proposers based on a determination of value provided, but shall not be required to rank more than five (5) proposers.

e. The District will award the contract, if at all, to the responsible DBE whose proposal is determined by the District to be the best value.

3. Submission – DBE's shall submit Statement of Qualifications, and Proposals in separate sealed envelopes. The District shall receive proposals no later than 2:00pm PT on **Wednesday, 9 / 28 / 2022**. Each envelope shall contain the following:

a. A single (1) unbound original copy of the complete SOQ or RFP including all required signed forms, Six (6) bound copies, and one (1) electronic copy of the SOQ or RFP on a flash drive

(1) Pricing proposal form shall **only** be contained in the RFP folder on attachment C

b. All materials shall be delivered to the District via the information listed on the RFQ/P cover sheet.

c. If DBE is not qualified upon review of SOQ, the sealed (Unopened RFP) will be returned to sender at address listed on envelope.

Any person or entity that has performed or is performing services for District relating to the solicitation of this design-build project, including, without limitation, services relating to the development of performance criteria, will **not** be eligible to submit a proposal as a design-build entity or to join a design-build team.

IV. FULL OPPORTUNITY

The District hereby affirmatively ensures that Disadvantaged Business Enterprise ("DBE"), Small Local Business Enterprise ("SLBE"), Small Emerging Local Business Enterprise ("SELBE") and Disabled Veterans Business Enterprise ("DVBE") firms shall be afforded full opportunity to submit qualifications in response to this RFQ and will not be discriminated against on the basis of race, color, national origin, ancestry, disability, gender, transgender status, political affiliation, or religion in any consideration leading to the award of contract.

V. LIMITATIONS

This RFQ is neither a formal request for bids, nor an offer by the District to contract with any party responding to this RFQ/P . The District reserves the right to add additional prequalified respondents for consideration after distribution of this RFQ/P , if it is found to be in the best interest of the District. All decisions concerning selection of the DBE will be made in the best interests of the District. The awarding of a contract pursuant to the RFQ/P, if at all, is at the sole discretion of the District.

The District makes no representation that participation in this RFQ/P process will lead to an award of contract or any consideration whatsoever. The District shall in no event be responsible for the cost of preparing any response to this RFQ/P .

SOQ's/Proposals submitted by respondents are not public records and are not open to public inspection. All information provided will be kept confidential to the extent permitted by law. The contents, however, may be disclosed to third parties for purpose of verification or investigation. State law requires that the names of respondents applying for prequalification status shall be public records subject to disclosure.

VI. RESTRICTIONS ON LOBBYING AND CONTACTS

From the period beginning on the date of the issuance of this RFQ/P and ending on the date of the award of the contract, no person, or entity submitting in response to this RFQ/P , nor any officer, employee, representative, agent, or consultant representing such a person or entity shall contact through any means or engage in any discussion regarding this RFQ/P , the evaluation or selection process/or the award of the contract with any member of the District, Board of Trustees, selection members, or any member of the Citizens' Oversight Committee. Any such contact shall be grounds for the disqualification of the respondent submitting a SOQ.

VII. STANDARD TEMPLATE FOR REQUEST FOR QUALIFICATIONS

Attached hereto as **APPENDIX B** is the District's prequalification template. Respondent must complete the prequalification template, certify its answers under penalty of perjury, and attach all information requested herein. The completed, certified prequalification template, together with all attachments, constitutes respondent's SOQ.

Each SOQ must be certified under penalty of perjury. If any information provided by a respondent becomes inaccurate, the respondent must immediately notify District and provide updated, accurate information in writing, under penalty of perjury.

VIII. EVALUATION

The District will evaluate all timely submitted SOQs. Each SOQ must be complete. Incomplete SOQs will be considered nonresponsive and grounds for disqualification. The District retains the sole discretion to determine issues of compliance and to determine whether a respondent is responsive and qualified. All SOQ's will be examined for merit by a screening committee according to quality and responsiveness. The top proposals will be placed on a short list and scheduled for interviews with the District. This process may include members from the District's Leadership team and other project contributors in the screening process. DBE presenters are expected to be personnel that will actually direct, execute, and complete the project. Scoring from the qualifications round will not carry forward to the Proposal competition.

Significant factors the District reasonably expects to consider in evaluating qualifications are as follows:

- All required licenses and registration to design and construct the Project, with no recent revocations or suspensions.

- Established performance history, including an absence of criminal or civil violations or significant disputes.
- Capacity to obtain required bonds and insurance of the Project.
- Design expertise and experience (including related projects).
- Construction expertise and experience (including related projects).
- Acceptable safety record.
- Skilled labor force availability.
- Financial capacity to complete the Project.
- Team experience with Design-Build (with a community college district), including key staff with DBIA credentials.
- Team experience with facility/building type.
- Team performance record (quality, schedule, cost); and
- Proposed team composition, including capability to work as an integrated project team and manage this project as a singular DBE.

District may use other sources of information outside of the SOQs to investigate respondents or verify answers. District's investigation may extend beyond contacting project references identified in SOQs.

After completing its evaluation, the District will notify respondents selected for prequalification and shortlisting.

IX. FINAL DETERMINATION

Qualification and shortlisting are at the sole discretion of the District. The District reserves the right to waive irregularities and omissions in the information contained in any SOQ, and to make all final determinations. The District further reserves the right to suspend or rescind prequalification at any time based on subsequently learned information.

The District makes no representation that participation in this RFQP process will lead to an award of contract or any consideration whatsoever. The District reserves the right to seek proposals from or to contract with any firm not participating in this process. The District shall in no event be responsible for the cost of preparing any SOQ or other response to this RFQ.

X. CONFIDENTIALITY

The District is a public agency subject to the disclosure requirements of the California Public Records Act ("CPRA"). If proprietary information is contained in documents or information submitted to the District, and Proposer claims that such information falls within one or more CPRA exemptions, Proposer must clearly mark such information "Confidential and Proprietary"

and identify the specific lines containing the information. In the event of a request for such information, the District will make best efforts to provide notice to Proposer prior to such disclosure. If a Proposer contends that any documents are exempt from the CPRA and wishes to prevent disclosure, it shall be required to obtain a protective order, injunctive relief, or other appropriate remedy from an applicable court of law before the District's deadline for responding to the request. If Proposer fails to obtain such remedy within the District's deadline for responding to the CPRA request, then the District may disclose the requested information. Proposer further agrees that it shall defend, indemnify, and hold District harmless against any claim, action, or litigation (including but not limited to all judgments, costs, fees, and attorneys' fees) that may result from denial by the District of a CPRA request for information arising from any representation, or any action (or inaction) by the Proposer. The District reserves the right to delay production of information which would reveal the number of proposals submitted or the identities of the Proposers, as well as copies of all proposal documents, until after negotiations are completed.

XI. CONSTRUCTION EXPERIENCE

Design Build Entity will confirm the following through the qualifications process:

- DBE has completed, on or after December 01, 2010, at least 4 projects (private or public) in the United States of America:
- Acting as the prime or subcontractor during the construction phase on the project.
- With an initial construction contract (prime or subcontract) award of $1,000,000 or more.
- Where the construction involved installation of medium voltage switchgear (greater than 600V) and 5 or more of the following: trenching, duct bank installation, provided temporary generators, emergency power system installation and modification, low voltage system installation, medium voltage splicing, commissioning, and testing of all systems that were install and modified, provided civil and landscape services to support all electrical work.
- Where the construction work occurred in an occupied building or immediately adjacent to an occupied building.

WE THANK YOU FOR YOUR INTEREST IN THE DISTRICT'S PROJECT!

APPENDIX A

Statement of Purpose.
The Solano Community College District (SCCD, "the District") is seeking proposals from Design Build Entities (proposers) in developing a cost-effective Substation Replacement project at their Fairfield Campus. The winning proposer will provide design and construction services for the project referenced within the RFP. District will select a team comprised of a: General Contractor, Architect, Key Sub Consultants, and Key Sub-Contractors (Collectively the Design-Build Entity) based on qualifications and proposed fees. Power to the campus is distributed through a single 12.47 kV feed, and further distributed utilizing12kV cabling through five existing substations. Replacement of the Substations is critical to the electrification of the campus and modernization of the Central Plant. The selected DBE's services will address the next round of infrastructure improvements to supplement the aging system.

Background Information.

The Solano Community College Fairfield Campus is located at 4000 Suisun Valley Rd, Fairfield, CA 94534. The District has access to Measure Q bond funds to use on infrastructure development and improvement, and wishes to utilize some of these funds to Replace campus Substations #3 and #4. Substation #3 provides power to the Central Plant (which will be replaced in the Spring of 2024), pool, and gym. This system was installed in 1970, and as such, is well beyond its design life. In addition to its age, it is prudent Substation #3 be upgraded with sufficient capacity to accommodate the campus's transition to electric heating. Substation #4 has received a number of upgrades, but exists in a similar condition where it too is beyond its design life. The campus electrical study presented evidence the cabling throughout the grounds appears 30-40 years old routed in transite piping.

The district is bound by time constraints on the utilization of the Measure Q bond monies. In conjunction with upgrades to the Central Plant (with anticipated Bid Issuance of 12/22), it is imperative the schedule work towards a substantial completion of August 31st, 2024. Final closeout would tentatively be scheduled for September 30th, 2024, to achieve deadlines associated with Bond spend down requirements.

The estimated project value is: $7,750,000

Technical Overview Documents.

The RFQP contains documents prepared by criteria Architect Salas O'Brien which include Design Build Performance Criteria, Technical Specifications, Bridging Drawings containing as-built conditions with general site schematic detailing, and standard District contract terms. Project Scope includes but is not limited to: Removal of existing substations #3 & #4, design, install, and procurement of equipment for a fully functional new Substation #3 & #4, with corresponding LV Switchboards, Feeders where identified, and install of new underground electrical vaults with pull boxes where identified.

APPENDIX B

[Download available on District Bid Website]

SOLANO COMMUNITY COLLEGE DISTRICT
QUALIFICATION TEMPLATE
DESIGN-BUILD ENTITIES

This standard prequalification template should be completed by design-build entities or design-build teams seeking to qualify for a Solano Community College District ("District") design-build project in accordance with Education Code section 81703.

As used in here:

- "DBE" refers both design-build entities and design-build teams.
- "Member" refers to individuals or entities identified as members of the design-build team, including the general contractor and, if utilized in the design of the project, all electrical, mechanical, and plumbing contractors.
- "Associates" refers to all current officers, owners, and/or partners of DBE and of any Member.

Wherever additional space is needed to answer a question fully and accurately, attach additional copies of the template pages and/or additional signed sheets as needed.

I. BUSINESS INFORMATION

A. Contact Information (Not Scored)

1. DBE Name: _____
2. Primary contact Person: _____
3. Principal office address: _____
4. Phone: _____
5. Fax: _____
6. Email: _____

B. Form of Organization (Not Scored)

1. If the DBE or any Member is a **corporation**:
    a. Date incorporated: _____
    b. Under laws of what state: _____

c. If a privately held corporation, list all shareholders who will perform work on the project:

Name	Ownership Percentage

d. Attach a copy of the articles of incorporation.

2. If the DBE or any Member is a **limited liability company**:

a. Date formed: _____

b. Under laws of what state: _____

c. List all LLC members who will perform work on the project:

Name	Ownership Percentage

d. Attach a copy of the articles of organization.

3. If the DBE or any Member is a **partnership**:

a. Date formed: _____

b. Under laws of what state: _____

c. List all partners who will perform work on the project:

Name	Ownership Percentage

d. Attach a copy of the partnership agreement.

4. If the DBE or any Member is a **joint venture**:

a. Date formed: _____

b. Under laws of what state: _____

c. List all joint venture members who will perform work on the project:

Name	Ownership Percentage

d. Attach a copy of the joint venture agreement.

5. If the DBE or any Member is a **sole proprietorship**:

a. Date formed: _____

b. Under laws of what state: _____

c. List owner: _____

d. Attach a copy of organizational documents, if any.

C. Financial Capacity (Pass/Fail)

1. Attach an audited financial statement with accompanying notes and supplemental information for the past 2 full fiscal years for DBE and each entity Member (not individual Members). A letter verifying availability of a line of credit may also be attached; however, it will be considered supplemental information only, and is not a substitute for the required financial statement.

2. Is DBE or any Member currently, or has DBE or any Member within the last 5 years been, the debtor in a bankruptcy case?

   ___ Yes ___ No

   If "yes," please attach a copy of the bankruptcy petition and a copy of the bankruptcy court's discharge or any other document that ended the case, if any.

II. LICENSING AND REGISTRATION

A. General Contractor

1. Name of license holder exactly as on file with the Contractors State License Board ("CSLB"): _____(Pass/Fail)

2. License classification(s): _____(Pass/Fail)

3. License #: _____(Not Scored)

4. Issue Date: _____(Not Scored)

5. Expiration Date: _____(Not Scored)

6. Public Works Contractor Registration # on file with the Department of Industrial Relations ("DIR"): _____(Pass/Fail)

7. Has any CSLB license held by the general contractor or its qualifying individual been suspended or revoked within the last 5 years? (0 – 5 Points)

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet.

8. Has the general contractor changed names or license numbers within the past 5 years? (Not Scored)

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet.

9. How many years has your organization been in business in California as a contractor under your present business name and license number? (0 – 5 Points)

B. Architect of Record

The architect of record is the architect whose stamp will appear on project documents.

1. Name of license holder exactly as on file with the California Architects Board ("CAB"): _____(Pass/Fail)

2. License #: _____(Not Scored)

3. Issue Date: _____(Not Scored)

4. Expiration Date: _____(Not Scored)

5. Has any CAB license held by the architect of record been suspended or revoked within the last 5 years? (0 – 5 Points)

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet.

6. Has the architect of record changed names or license numbers within the past 5 years? (Not Scored)

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet.

7. How many years has your organization been in business in California as an architect under your present business name and license number? (0 – 5 Points)

C. Engineer(s)

Engineering services will be dictated by the nature of the project. The DBE should respond for all "in house" engineers that will provide services on the project. If relevant, use additional signed sheets to respond for multiple engineering disciplines.

1. Name of license holder exactly as on file with the Board of Professional Engineers, Land Surveyors, and Geologists ("BPELSG"): _____ (Pass/Fail)

2. License Type: _____(Not Scored)

3. Licenses #: _____(Not Scored)

4. Issue Date: _____(Not Scored)

5. Has any BPELSG license held by the engineer been suspended or revoked within the last 5 years? (0 – 5 Points)

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet.

6. Has the engineer changed names or license numbers within the past 5 years? (Not Scored)

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet.

7. How many years has your organization been in business in California as an engineer under your present business name and license number? (0 – 5 Points)

D. Mechanical, Electrical, or Plumbing Contractor(s)

If utilized in the design of the project, respond for all mechanical electrical, or plumbing ("MEP") contractors. If relevant, use additional signed sheets to respond for multiple MEP contractors.

1. Name of license holder exactly as on file with the Contractors State License Board ("CSLB"): _____ (Pass/Fail)
2. License classification(s): _____ (Not Scored)
3. License #: _____ (Not Scored)
4. Issue Date: _____ (Not Scored)
5. Expiration Date: _____ (Not Scored)
6. Public Works Contractor Registration # on file with the Department of Industrial Relations ("DIR"): _____ (Pass Fail)
7. Has any CSLB license held by the MEP contractor or its qualifying individual been suspended or revoked within the last 5 years? (0 – 5 Points)

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet.

8. Has the general contractor changed names or license numbers within the past 5 years? (Pass/Fail)

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet.

9. How many years has your organization been in business in California as a contractor under your present business name and license number? (0 – 5 Points)

III. PERFORMANCE HISTORY

1. Has DBE or any Member or Associate ever been found liable in a civil suit, or found guilty in a criminal action, for making any false claim or material misrepresentation to any public agency or entity? (-5 to 5 Points)

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet, including identifying who was found liable or guilty, the court and case number, the name of the public entity, the civil or criminal verdict, the date, and the basis for the finding.

2. Has DBE or any Member or Associate ever been convicted of a crime involving any federal, state, or local law related to construction or any crime involving fraud, theft, or any other act of dishonesty? (-5 to 5 Points)

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet, including identifying who was convicted, the name of the victim, the date of the conviction, the court and case number, the crimes, and the grounds for the conviction.

   If "yes," explain on a separate signed sheet, including the project, owner, owner's address, date of completion, and amount of liquidated damages.

3. At any time in the last 5 years, has DBE or any Member or Associate been debarred, disqualified, removed or otherwise prevented from bidding on, or completing, any public works project? (Pass/Fail)

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet, including the project, the year of the event, owner, owner's address, and basis for the action.

4. At any time in the last 5 years, has a public agency found that DBE or any Member was not a responsible bidder? (0 – 5 Points)

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet, including the project, the year of the event, owner, owner's address, and basis for the finding.

5. In the past 5 years, has any claim exceeding $50,000 been filed by or against DBE or any Member in court or arbitration concerning work or payment on a construction project? (0 – 5 Points)

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet, including the project name, court or arbitration case name and number, and a brief description of the status of the claim.

6. In the past 5 years, has there been more than one occasion in which DBE or any DBE member was required to pay either back wages or penalties for failure to comply with California prevailing wage laws or federal Davis-Bacon prevailing wage requirements? (Pass/Fail)

___ Yes ___ No

If "yes," explain on a separate signed sheet, describing the nature of the violation(s), project, owner, and amount paid, if any.

7. At any time during the past 5 years, has DBE or any Member been found to have violated any provision of California apprenticeship laws or regulations, or laws pertaining to use of apprentices on public works projects? (Pass/Fail)

___ Yes ___ No

If "yes," explain on a separate signed sheet, including date(s) of such findings and attaching the DAS' final decision(s).

8. In the past seven years, has your firm made any claim against a project owner concerning work on a project or payment for a contract, and filed that claim in court or arbitration? If so, how many? (0 – 5 Points)

___ Yes ___ No

9. If your firm was required to pay a premium of more than one per cent for a performance and payment bond on any project(s) on which your firm worked at any time during the last three years, state the percentage that your firm was required to pay. (0 – 5 Points)

_____

IV. BONDS AND INSURANCE

A. Bonds

1. Attach a notarized statement from an admitted surety insurer (approved by the California Department of Insurance and authorized to issue bonds in the State of California), which states the current bonding capacity of the DBE (both single job limit and aggregate limit). Note: DBE must have capacity to provide 100% payment bond and 100% performance bond, each issued by an admitted surety insurer, without bonding subcontractors.

2. Provide the name, address, and telephone number of the surety agent: _____
_____
_____

3. List all sureties that have written bonds to the DBE or any Member during the last 5 years:

Name	Address	Date of Bond

4. In the last 5 years, has any surety paid on behalf of the DBE or any Member a result of a default to satisfy any claims made against a payment or performance bond? (0 – 5 Points)

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet, including the amount of each claim, name and telephone number of claimant, date of and grounds for the claim, and present status.

5. If DBE or any Member was required to pay a premium of more than 1 percent for a performance and payment bond on any project in the last 5 years, state the percentage (0 -5 Points): _____

   Explain on a separate signed sheet why DBE or Member was required to pay the premium of more than 1 percent.

6. In the last 5 years, has DBE or any Member been denied bond coverage by a surety company or had no surety bond in place when one was required? (0 -5 Points)

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet, including the name of the surety company and/or period during which DBE or Member had no bond in place.

B. <u>Insurance</u>

1. Does DBE have liability insurance with a policy limit of at least $2,000,000 per occurrence and $4,000,000 aggregate for a California admitted company? (Pass/Fail)

   ___ Yes ___ No

   If "no," provide on a separate signed sheet what policy limits are available to DBE.

2. Does DBE have current workers' compensation insurance as required by the California Labor Code or is DBE legally self-insured pursuant the California Labor Code?

3. Does DBE have professional liability (errors and omissions) insurance with a policy limit of at least $2,000,000 aggregate from a California admitted company? (Pass/Fail)

   ___ Yes ___ No

If "no," provide on a separate signed sheet what policy limits are available to DBE.

4. In the last 5 years, has any insurance carrier, for any form of insurance, refused to renew an insurance policy for DBE or any Member?

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet, including the name of the insurance carrier, form of insurance, and year of the refusal.

V. SAFETY

1. Attach a description, not to exceed 1 page, of DBE's worker safety program as applicable to this project.

2. Within the past 5 years, has the California or federal Occupation Safety and Health Administration ("OSHA") cited and assessed penalties against DBE or any Member, for "serious," "willful" or "repeat" violations of its safety or health regulations? If yes, how many times? (0 – 5 Points)

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet, identifying the citation(s), nature of the violation(s), project, and amount of penalty paid, if any.

3. Within the past 5 years, has the Environmental Protection Agency ("EPA") or any Air Quality Management District or any Regional Water Quality Control Board cited and assessed penalties against DBE or any Member or the owner of the project on which DBE/Member was the contractor? If yes, how many times? (0 – 5 Points)

   ___ Yes ___ No

   If "yes," explain on a separate signed sheet, identifying the citation(s), nature of the violation(s), project, and amount of penalty paid, if any.

4. State the Workers' Compensation Experience Modification Rate ("EMR") for DBE and each Member for the past 3 premium years. A bidder's "safety record" shall be deemed "acceptable" if its experience modification rate for the most recent three-year period is an average of 1.00 or less, and its average total record-able injury or illness rate and average lost work rate for the most recent three-year period does not exceed the applicable statistical standards for its business category, or if the bidder is a party to an alternative dispute resolution system as provided for in Section 3201.5 of the Labor Code (0 – 5 Points) :

Year	EMR

If EMR was 1.00 or higher in any of 3 years, attach a letter of explanation.

5. State the total recordable injury or illness rate and the lost work rate for DBE and each Member for the past 3 years:

Year	Incident Rate	Lost Work Rate

6. Within the past 5 years, has there ever been a period when DBE or any Member had employees but was without workers' compensation insurance or state-approved self-insurance? (0 -5 Points)

   ___ Yes ___ No

   If "yes," explain on separate signed sheet, including the date(s) and reason(s) for the absence of workers' compensation insurance.

7. At any time during the last seven years, has your firm been found to have violated any provision of California apprenticeship laws or regulations, or the laws pertaining to use of apprentices on government construction projects? If yes, how many times? (0 -5 points)

   ___ Yes ___ No

VI. PROJECT EXPERIENCE AND REFERENCES

1. How many design-build projects have the general contractor and architect of record involved in this DBE completed together? (0 – 5 Points) _____

2. For the completed design-build projects identified in the preceding answer, state (Not Scored):

   a. Total dollar value of all contracts: _____

   b. Dollar value of single largest contract: _____

3. Complete the project reference form attached hereto as **Exhibit B-1**. District may, in its discretion, contact project references.

4. Attach resumes or similar documents, not to exceed 1 page each, showing the experience, training, and qualifications for up to 6 proposed key personnel of the DBE.

5. Within the past seven (7) years, how many Substation or Similar Infrastructure Projects has your organization contracted for and completed a minimum of 75% or more of the actual construction work? (0 – 5 points): _____

6. Within the past seven (7) years, how many K-12, Community College, Public University or other Public Works projects with an original construction contract value of $5 million or more has your firm contracted for and completed at a minimum 75% or more of the actual construction work? (0 – 5 points): _____

7. Within the past seven (7) years, how many DSA (Division of the State Architect) projects with an original construction contract value of $5 million or more has your firm contracted for and completed at a minimum 75% or more of the actual construction? (0 -5 Points): _____

8. Within the past seven (7) years, how many Design-Build Projects has your organization delivered under DSA (Division of the State Architect)? (0 -5 points): _____

VII. SKILLED AND TRAINED WORKFORCE COMPLIANCE

1. By this submittal, DBE hereby acknowledges, agrees, and provides an enforceable commitment to District that:

    a. DBE and its subcontractors at every tier will use a skilled and trained workforce to perform all work on the project or contract that falls within an apprenticeable occupation in the building and construction trades, in accordance with Public Contract Code section 2600 et seq.; or

    b. DBE has agreed to by bound by: (i) a project labor agreement ("PLA") or project stabilization agreement ("PSA") entered into by the District that will bind all contractors and subcontractors performing work on the project to use a skilled and trained workforce; (ii) the extension or renewal of a PLA or PSA that was entered into by the District prior to January 1, 2017; or (iii) a PLA or PSA entered into by the DBE that will bind the DBE and all its subcontractors at every tier performing work on the project to use a skilled and trained workforce.

[CERTIFICATION ON NEXT PAGE]

VIII. CERTIFICATION

DBE and all Members must sign. Copy this certification page as needed for each Member.

I certify and declare that I have read all the foregoing answers to this prequalification template and that all answers are correct and complete of my own knowledge and belief. I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Date: _____, 20__

Name of DBE or Member: _____

Signature by authorized individual: _____

Print Name: _____

Title: _____

EXHIBIT B-1

Design-Build Project References

List the three most recent design-build projects, each with a contract price over $5 million, completed by the general contractor for the DBE. The projects may be public or private. Contact information must be current and viable. (Optional Excel Sheet provided as supplement for Exhibit B-1)

1. Project Name: _____
2. Project Address: _____

   _____
3. Owner (name and tel. #): _____

   _____
4. Architect (name and tel. #): _____

   _____
5. Construction Manager (name and tel. #): _____

   _____
6. Scope of Work: _____

   _____

   _____
7. Original Completion Date: _____
8. Actual Complete Date: _____
9. Time Extensions Granted (# of days): _____
10. Initial Contract Value: _____
11. Final Contract Value: _____

Date: _____, 20__

Signature by authorized individual: _____

Print Name: _____

Title: _____

REQUEST FOR PROPOSAL

I. Scope Overview

Reference Appendix A in Qualifications Section.

Pricing Proposals.

Proposed pricing must reflect general conformance with technical requirements in Attachment A and must also address foreseeable construction issues. The pricing proposals must be submitted using the form provided as Attachment C.

Technical Requirements.

Proposers are expected to utilize industry best practices in responding to this RFP and in performing their responsibilities under a contract with the District. It is the intent of the district that the work to be performed by the DBE as part of the project shall be designed and constructed in accordance with the criteria documents set forth in Attachments A/B. Design concepts set forth in the bridging documents are provided for reference only, and as a guide to the District's design goals and long-term campus electrification plan. DBE is not bound to follow the design concepts in any specific manner. DBE shall remain responsible for the adequacy and completeness of all aspects of the design. Proposers will be required to acquire DSA Approval of design documents, Building Permits, and a local business license before starting construction. Proposers must also acquire DSA Certification upon completion of the project.

Contracting and Bonding Requirements.

Key contract terms and conditions have been identified and included in Attachment C. The District will require Payment and Performance Bonds to be posted prior to construction.

Insurance and Indemnification Requirements.

Attachment B provides the District's insurance and indemnification requirements within the contract terms. If you do not currently carry the type/limit of insurance stated herein, please submit your Proposal with any differences clearly noted. Indicate if you would be able to obtain the proposed insurance and, if so, indicate the dollar amount, if any, that your Proposal would be increased due to the cost of this insurance. Finally, please indicate any other issues you or your insurance carriers may have with the proposed insurance requirements and why. Shortlisted proposers should be prepared to provide both Certificates of Insurance (COI) and a copy of the full insurance policy.

Pricing and Assumptions.

In addition to requirements as specified in this RFP and Attachments, Proposers should use the following assumptions when providing pricing and project cash-flow analysis:

- Assume construction start date between **June 2023 – September 2023** for pricing calculations. Actual start dates will depend on contract negotiations, public and permitting approvals, and supplier lead-times, weather, and other variables.
- Pricing must include complete design and construction of the proposed systems, with maintenance of said systems included as separate line items. Design shall include all aspects, including, but not limited to, structural investigation, electrical modification, and aesthetics of proposed systems.

Contract Negotiations.

It is expected that the District and selected Proposer will commence a common process for negotiating final terms and conditions of any contracts resulting from this procurement. These negotiations will utilize the template contract provided by the District (see Attachment C). *Exceptions to key terms must be listed by Proposers*. Selection of a Proposer in no way implies District acceptance of exceptions to the District's Sample Contract.

Proposers submitting responses to this RFP do so with the understanding that the District does not guarantee the award of any contract or work. The District reserves the right, in their sole and absolute discretion, to abolish, refresh, amend, or extend the scope or limitations of this Project.

Project Requirements.

The stipulated sum for this project is $7,750,000. This stipulated sum includes, but is not limited to, all permits, fees, utility connections and fees, labor, materials, equipment, tools, and construction, along with design and management fees for services provided by the DBE, to deliver complete and operable project. Liquidated damages are in the amount of three thousand five hundred dollars ($3,500) for each calendar day that the project extends beyond the substantial completion date, and one thousand five hundred dollars ($1,500) for each calendar day that the project extends beyond the final completion date. The contract duration estimate is 24 months. Improvements to estimated budgets and durations will be entertained during the RFP Process (If the established parameters cannot be met because of market volatility provide a brief narrative and timeline DBE can achieve substantial completion of scope). DBE is required to be licensed in the State of California with a Class 'B" – General Contractor License – the Architect is required to be licensed in the State of California.

II. Timeline of Key RFP Dates.

Reference the preliminary RFQ/P schedule illustrated in the Qualifications section on page 3.

Mandatory Pre-Proposal Webinar.

The District will host an online pre-proposal webinar via Microsoft Teams at **11:00 AM PT** on **Monday, 8 / 29 / 2022**. Any Proposer wishing to submit a proposal to this RFP must attend this meeting. Interested parties should RSVP to the contact email listed on the RFQ/P cover sheet. *A link to the webinar will be sent via email to prospective bidders who have RSVP'd. Please RSVP at least 2 hours prior to the webinar.* The intention of this meeting is to provide clarification on content in the RFQ/P. Additionally, a site visit is scheduled for **Tuesday, 8 / 30 / 2022 at 10:00 AM PT**; attendance at this site visit is required. Certification of having completed a site walk must be submitted as part of the proposal. Attendance will be documented by District staff at both the webinar and the site walk.

Site Walk COVID-19 Protocols.

Considering the ongoing COVID-19 pandemic, site walk attendees are required to abide by current CDC, State of California, and Solano County COVID and social distancing protocols. Further instructions will be given leading up to the date of the site walk. Proposers will not send representatives who show symptoms of COVID-19, regardless of severity.

Deadline for Written Questions.

Before 2:00pm PT on **Wednesday, 9 / 7 / 2022** Proposers must submit all questions about the meaning or intent of this RFP and other Proposal Documents to the District via the contact email listed on the RFP cover sheet. All questions and requests for information and clarification received before the stated time and date will be addressed by the District through formal written Addenda, which will be posted on the District's website by **Wednesday, 9 / 14 / 2022**. Only questions answered by formal written Addenda shall be binding. Oral and other interpretations or clarifications will be without legal effect. Any attempt by a Proposer to contact any other District staff member regarding this RFP may result in disqualification of the Proposer.

Addenda.

If the District deems advisable, the District may also issue Addenda to modify the Proposal Documents. Addenda shall be acknowledged by submission of Attachment C by number and date and shall be part of the Proposal. It is the proposer's responsibility to ensure that all requirements of addenda are included in the proposer's Proposal. Proposers may obtain a complete listing of Addenda from the District's website.

RFP Due Date.

The District shall receive, no later than 2:00pm PT on **Wednesday, 9 / 28 / 2022**, a single copy of the full proposal, including all required signed forms, as well as a completed Pricing and Proposal form (Attachment C) in a sealed envelope – labeled and separate from the RFQ submission. Contents shall also include a flash drive with consolidated PDF file of RFP submission. All materials, including copyrights for original design work, submitted by Proposer

in response to this Request for Proposals shall become the property of the District. All materials shall be delivered to the District via the information listed on the RFQ/P cover sheet. If DBE is deemed not qualified upon review of SOQ, the sealed (Unopened RFP) will be returned to sender.

Proposer Interviews.

During the week of **10 / 9 / 2022,** the District may conduct individual interviews with shortlisted Proposers. Those Proposers will comprise a short-list of preferred vendors and will be notified of the time and virtual location in advance of the interview. The purpose of these interviews is to confirm information provided in proposals submitted by the Proposers, and to allow Proposers to respond to District questions and to provide clarifications and expand on the information provided in their proposals. Each Proposer shall have their proposed key personnel assigned to the project present as the primary representatives during this process. Presentation materials shall typically include Electronic Media (PowerPoint) and supporting materials.

Upon completion of interviews and proposal evaluations, selected Proposer or Proposers shall be notified, and contract negotiations with the District may begin. If the selected Proposer(s) are unable to effectively execute contracts with the District, other shortlisted Proposers may be contacted to develop the proposed projects.

Evaluation & Selection.

The RFP evaluation is solely for the purpose of determining which Proposers are deemed responsible, qualified, and able to offer the best value to the District. Qualifications of applicants will be reviewed and determined by the District and their consultants based upon the submitted documents and any other information available to them. Proposals shall be deemed to include any written responses of a Proposer to any questions or requests for information of the District made as part of the Proposal evaluation process after submission of the Proposal. Applicants may be asked to submit additional information pertinent to the Projects, or to be present for a virtual interview. The District also reserves the right to investigate and rely upon information from other available sources in addition to any documents or information submitted by the Proposer.

The District retains the sole discretion to determine issues of compliance and to determine whether a Proposer is responsive and responsible. The District will determine a Proposer's quality, fitness, and capacity to perform the project satisfactorily. Proposers are encouraged to submit a single proposal that includes solutions and subcontractors required to complete the system elements. There will only be one contract holder/counterparty. Each submittal will be judged as a demonstration of the Proposer's capabilities of delivering the services requested with high quality and low total lifetime costs. Evaluation of the responses will be based on a competitive selection process, in which the evaluation of proposals will not be limited to price alone. The Selection Committee's decision will be based on the evaluation of several factors including, but not limited to, the following:

Technical Proposal *(20 points)*

- Preliminary system designs appropriate for site needs and accounting for site conditions
- Shutdown and load transfer proposal
- Commissioning and testing
- Adequate provisions for future expansions.

- Adequate provisions for access and maintenance .
- Materials and Systems proposed conformance to campus standards as well as industry standards .

Price Proposal *(20 points)*

- Including Design cost, construction fee, general conditions cost, and subcontractor markup.
    - Points to be assigned on a linear basis against the low DBE bidder. i.e., If the low DBE bid is $500,000, this would score 25 points, and second bidder cost is $450,000, they would score ($450,000/500,000) x 25 points = 22.5 points.

Implementation Plan and Schedule *(15 points)*

- Complete and thoughtful Risk Management & Safety Plan
- Proposal is complete and addresses requirements and preferences stated in the RFP and demonstrates experience working with public agencies
- Ability to meet proposed schedule.
- Adequate provisions to accommodate and minimize downtime and impact to campus.

Contract Terms & Conditions *(10 points)*

- Ability to work with desired District Contract Terms and Conditions, Insurance, and Indemnification requirements
- None or minor objections to key terms and requirements

Proposed Project Team and Experience *(10 points)*

- Strength of qualifications and experience of partner firms and key personnel
- Strength of project references with regards to customer satisfaction, completion of projects equivalent to those included in this RFP, and success in maintaining project budgets and schedules
- Team delivers the most complete energy development package to successfully address all the identified systems

Interview *(10 points)*

- Interview performance and articulation on approach to work for successful project

Substitution/Alternates for Project Enhancement *(5 points)*

- Contribution to proposed project design for improvements to schedule, quality, and project costs

All Additive Alternatives must be of high quality, add significant value, provide benefit to the District, and are beyond the minimum requirements established in the RFP.

The District will develop preliminary scores, which will then be augmented for short-list Proposers during or after Proposer interviews. The Proposer with the highest consensus score will be invited to enter contract negotiations with the District.

Proposers are urged to review evaluation factors listed above and tailor the response to provide clarity in all areas including, but not limited to, cost, implementation, technical design, warranties, performance guarantees, and company experience.

Award.

Any contract(s) for this Project will be awarded to the qualified Proposer able to effectively negotiate terms for the project that provide the "best value" to the District as determined solely by the District and its agents. The District reserves the right to reject any or all proposals or any part of an individual proposal; to waive any irregularity in any proposal; and to determine which, in its sole judgment, best meets the goals of this RFP. The District also reserves the right of refusal for subcontractors and team members at the project's outset and throughout the Systems' lifetime.

Prevailing Wage Requirements and Other Requirements.

Proposers are notified and informed that they will be subject to and must comply with all the requirements under the California Labor Code to pay the general prevailing rate of per diem wages and for holiday and overtime work to all workers engaged in the performance of any work under the proposed contracts. Copies of prevailing rates of per diem wages are available from the Department of Industrial Relations, State of California. Proposer and any subcontractors shall comply with all federal, state, and local laws and regulations applicable to the performance of the work hereunder, including but not limited to, the California Building Code, local building codes, utility interconnection regulations, the Americans with Disabilities Act, and any copyright, patent, or trademark law. Proposer's Failure to comply with any law(s) or regulation(s) applicable to the performance of the work hereunder shall constitute a breach of contract.

AB 1768 (effective January 1, 2020), amended the definition of "construction" work for which prevailing wages must be paid to include "work performed during the design, site assessment, feasibility study, and other pre-construction phases of construction…regardless of whether any further construction work is conducted…" Proposers shall comply with all applicable provisions of the California Labor Code relating to the payment of prevailing wages.

Proposers are required to be registered as a Public Works Contractor with the Department of Industrial Relations pursuant to the Labor Code. The Proposer's and Subcontractor's registration must remain active throughout the term of the Contract.

Project Labor Agreement.

Proposers are further informed that the project will be subject to the Measure Q Project Labor Agreement (PLA). All subcontractors shall also be required to execute Letter of Assent under the PLA.

Non-Discrimination.

Contractors shall not discriminate against any employee, subcontractor, or applicant for employment because of race, color, creed, religion, sex, marital status, sexual orientation, national origin, ancestry, age, physical or mental handicap, or medical condition. Contractor will take affirmative action to ensure that employees are treated without regard to race, color, creed, religion, sex, marital status, sexual orientation, national origin, ancestry, age, physical or mental handicap, or medical condition.

The RFP specifications, terms, conditions, Attachments, and Addenda, and Proposer's proposal, in whole or in part, may be incorporated into and made a part of any contract that is awarded because of this RFP.

III. Proposal Preparation & Submittal

Each Proposer must conform with and be responsive to the submittal formats required by the District. Any deviation from the standard application forms (where applicable) or failure to provide the required information may be considered non-responsive and grounds for rejection of the proposal. The District may reject any or all proposals or any part of an individual proposal, or waive any irregularities in any responses received, at its sole discretion. Submittals for past projects with the District are not applicable to this RFP.

Proposal submittals must be submitted as a single electronic PDF file (with Attachment C as a separate PDF file), must not exceed 25 pages (excluding attachments as identified below and team resumes) and must follow the ordering format as shown below:

Section 1. Executive Summary (1 - 2 pages)

Company name and contact information, High-level description of the professional background of the company and project team, proposed project scope, project management approach, proposed bid alternates (if applicable), and description of relevant company experience with equivalent projects. Summary shall include a table of contents with reference to all RFP sections & attachments.

Section 2. Relevant Project Experience (1 - 2 pages)

Description of relevant project experience for organizational team members and key personnel, both prior to and during their time at the current firm. Description of the Proposer team structure, including firm address(es), key contacts, and roles in the proposed project for each Proposer team member. The proposer must identify subcontractors and show how the scope will be divided between the Prime and subcontractors. This description must be supplemented by an organizational chart for the project.

Section 3 Project References (3 pages)

Minimum of five (5) references for successfully completed projects of similar size and scope, with contact information for each client's key project liaison. Proposers should focus on Substation and high voltage electrical system projects that were contracted with public agencies. Note that the District and/or its designated representatives may contact some or all the provided references. The District reserves the right to: (a) check all, any, or no references that the District deems necessary, to assess a firm's past performance; (b) contact all or as many references the District determines are representative projects demonstrating experience that is relevant to this scope of services; and (c) check any other reference(s) that might be indicated through the explicitly specified contacts or that result from communication with other entities involved with similar projects, including other industry sources and users of similar services known to the District.

Section 4. Preliminary System Design (2 - 4 pages)

Designs should adhere to specifications according to Attachment A and include the following:

- **Substation site overview** with proposed equipment layout
- Product **spec sheets** and **warranty information** for proposed electrical system - *Not included in page count (Include as Appendix Document)*
- Shutdown and load transfer method of procedure
- Interception and tie in plan to existing campus 12KV system

Section 5. Project Schedule (1 - 2 pages)

High-level overall project schedule for the project, assuming contract negotiations beginning in October 2022. Proposer should note mandatory project milestones and deadlines. A PDF of a Gantt chart or similar project management software illustration with narrative explanation is the desired format. A suggested approximate project timeline is shown above in Section III "Timeline of Key RFP Dates".

Section 6. Risk Management and Safety Plan (1 minimum)

Describe considerations and contingency plans for supply risk-management related to COVID-19 or other delays. Please provide a safety plan related to construction and operation of the proposed systems (e.g., annual testing to validate the functionality of the systems). This plan should include considerations for staff training and fire safety including any testing certifications achieved (i.e., UL 9540A as specified in NFPA 855, UL 9540).

The successful proposer shall submit a project specific Injury and Illness Prevention Program (IIPP) and Heat Illness Prevention Plan (HIPP), along with any additional safety protocols that will be implemented. Considering the ongoing COVID-19 pandemic, Proposers should specify additional safety costs related to COVID safety and include these into the bid costs. The District is not responsible for COVID-related safety costs not clearly expressed in the bid costs. <u>This/these Plan(s) will not be counted towards the final page count.</u>

Section 7. Proof of Valid Licensing

Proof of valid and current Contractor's license. Only Proposers with a Class B Contractor's license and who have been approved through this process will be eligible to contract for the Project. Proposers must have the appropriate Contractor's license to complete the required work either in-house or via the Proposer's listed sub-contractor(s). <u>This section will not be counted towards the final page count.</u>

Section 8. Cost Proposal Form (Attachment C)

Cost proposal for direct purchase of Systems, including payment of Prevailing Wages, must be submitted on the form included as Attachment C Pricing must include all aspects of providing a turn-key solution and must address the requirements and constraints noted in Attachment B and foreseeable contracting and site conditions, including, but not limited to, those identified in Attachment A, site walk(s), and RFQ/P Addenda.

In the electronic submission, Attachment C must be attached in PDF format. This section will not be counted towards the final page count.

Section 9. Key Contract Term Exceptions (1 page)

Any exceptions to the District's key contract terms, conditions and requirements in Attachment B of this RFP must be stated in this section. This list should identify certain specific areas of the contract that should be addressed, along with Proposer-provided language suggestions for how they might be addressed.

Section 10. Response Checklist & Required Forms

Signed Response Checklist (Attachment D) and Required Forms Listed Below. These materials will not be counted towards the final page count.

- **Exhibit D.1 – Site Visit Certification**
- **Exhibit D.2 – Non-Collusion Declaration**
- **Exhibit D.3 – Project Labor Agreement**
- **Exhibit D.4 – Iran Contracting Act Certification**

Proposers must complete a guided site visit prior to submittal of proposals. Proposers who do not attend the Optional Site Visit should, at some point before submittal, coordinate with District staff and visit the Fairfield Campus to comply with this form and attach it to their submission. Proposers may not be able to access all areas of the campus available on Optional Site Visit.

Cost of Proposal Development. The District shall not bear any financial responsibility for costs incurred by the Proposer in responding to this RFP or any subsequent proposal, whether the Proposer's proposal is successful, including the costs for bonding, legal costs for any reason, visitation costs, reproduction, postage/mailing and other related costs.

IV. Project Scope

Responsive proposals shall propose a task scope that addresses the Objectives described in RFP. More detail and information around technical specifications of each task item can be found in Attachment A.

Upon successful contracting with the selected Proposer, the District and contractor shall hold a kick-off meeting to establish points of contact, schedule milestones, and roles and responsibilities for the project. The project development shall proceed roughly along this pathway: The District will review and approve design documentation based on the requirements in this RFP and as detailed in Attachment A. The District may request additional documents as needed. Prior to the first design submission, the Contractor and District shall agree upon precise organization and format of the design submittals. The District and Engineer of Record will review all submittals, provide written comments, and conduct Design Review Meetings for each stage of the process. Contractor shall provide additional detail, as required, at each successive stage of the Design Review. Contractor shall not order equipment and materials until Design submittals have been approved unless Contractor desires to order sooner at Contractor's own risk. Contractor shall not begin construction until Construction Documents have been approved by the District and the Division of the State Architect (DSA) and all required permits have been obtained. **The District will formally approve, in writing, each phase of the design and is the sole arbiter of whether each phase of the design has been completed.** The Contractor shall not enter a subsequent design phase without the approval of the District, unless at the Contractor's own risk.

The proposed scope shall include, at a minimum, the following project Tasks:

1. *Complete full design and engineering for entire project*
    - Review and update analysis of energy load data provided by the District.
    - Review and revise electrical distribution infrastructure plans provided by the District.
    - Prepare and submit engineering and design documents for District review and approval including but not limited to:
        - Site plans, elevations, schedules, equipment arrangement and detailed drawings with location and layout of all system equipment (Include control panels; cable and conduit counts, sizes, and materials; racking, blocking, and any emergency shut-off switches required by local jurisdiction)
        - Single-line diagrams including local utility system tie-ins
        - All other drawings, calculations, details, and schedules required for the system design.
        - The successful bidder will utilize ProCore
    - Safety, code, and efficiency recommendations resulting from onsite systems review.
    - Permitting, inspections, and special inspections as required by DSA

DELIVERABLES

- As-built system review documentation and remediation recommendations.
- Three (3) sets of project final plans, signed by a California registered professional engineer, printed, and signed on 24"x36" paper, with additional electronic versions in editable native file format, book marked pages, hyperlinked details, and text-searchable PDF format.
- One (1) high resolution, electronic version of the final construction-grade specifications in editable native file format and text-searchable PDF.

- Updated construction, integration, and commissioning plan and schedule.
- Notice to proceed with construction from the District.

2. *Secure all required permits and approvals*
   - Identify, secure, adhere to, and submit all government permits and approvals required for installation of complete Substation scope, including DSA review and approval, and DSA certification at Project Completion. All permits and fees should be included in DBE fee.

DELIVERABLES:
- All required filings, notices, permits, and approvals
- PG&E interconnection application
- PG&E interconnection agreement
- Utility Permission to Operate

3. *Procure and deliver all equipment, supplies, services, etc.*
   - Coordinate with the District to develop delivery schedule and storage plans
   - Update detailed specifications and equipment schedule to reflect any changes or additions established during permitting and pre-construction inspection processes.
   - Arrange and manage procurement, delivery, and secure storage of all equipment and materials.

DELIVERABLES:
- Approved Procurement Plan
- Delivery schedule and materials storage plan and map
- Bill of lading for all procured and delivered equipment and materials
- Manufacturer/vendor manuals, specifications, and other documentation

4. *Complete integration and configuration of all system controls*

Complete all tasks necessary to configure all communications, telemetry, controls, and human interfaces required to manage and execute all Substation functions including but not limited to:

- System Monitoring and load logging
- Power system study

DELIVERABLES
- Training and License Seats

5. *Complete construction closeout*

Submit digital as-built record drawings, final punch list, complete Substation system manuals (if applicable) and other documentation as required by the District.

DELIVERABLES
- As-built record drawings and documentation in cad format

- Construction closeout report including completed punch lists
- Updated performance guarantee agreement
- All DSA required closeout documentation, including obtaining DSA Certification
- Power system study model

6. *Train District staff on system operations and maintenance*
   - Deliver complete system O&M documentation including Control Manual.
   - Deliver Operator Training Document Set and provide formal training in all functions to be performed by site staff, including configuring and adjusting control modes, monitoring, and analyzing performance, retrieving system data logs and reports, and basic troubleshooting.
   - Deliver schedule of recommended periodic maintenance and testing, including identification of maintenance and testing steps required for manufacturer warranties and compliance with safety protocols and other operating standards.
   - All District Staff training should be video recorded and turned over to the District.

All operator manuals shall be subject to District review and approval before they are deemed final and accepted for system operation and training.

DELIVERABLES:
- Substation Manual (If applicable)
- Operator Training Document Set
- Other system O&M Manuals as appropriate
- Schedule of Periodic Maintenance and Testing
- Training Videos

ATTACHMENT A: Technical Overview Documents

Files are available for download on District website

- **A.1 – Technical Requirements**
- **A.2 – Technical Specifications**
- **A.3 – Project Bridging Drawings**

ATTACHMENT B: Key Contract Terms & Insurance Requirements

Files are available for download on District website

- **B.1 – Design Build Contract Agreement**
- **B.2 – Design Build Contract Documents**

ATTACHMENT C: Pricing Proposal

Files are available for download on District website

- **C.1 – Pricing Proposal Form**

ATTACHMENT D: Response Checklist & Required Forms

Files are available for download on District website

- **D.1 – Site Visit Certification**
- **D.2 – Non-Collusion Declaration**
- **D.3 – Project Labor Agreement (Letter of Assent)**
- **D.4 – Iran Contracting Act Certification**

Attachment A.1

DESIGN BUILD PERFORMANCE CRITERIA FOR REPLACEMENT OF SUBSTATION 3 AND 4

Solano Community College District
4000 Suisun Valley Road
Fairfield, CA 94534
RFQ # 23-001

AUGUST 17th, 2022

PROJECT OVERVIEW

This document, along with the scoping document plans, and specifications serves as bridging material to furnish prescriptive and performance criteria to qualified design/build companies bidding on the design and construction scope of this equipment replacement project.

Solano Community College District ("District") is soliciting proposals for a Design-Build Entity to:

1. Design, construct, test, commission, and place into service two new electrical substations to replace the existing substations #3 and #4.
2. Substation #3 to be located outside of the central plant and within a new fenced-in electrical yard.
3. Substation #4 to be located either within the same footprint of the existing substation or adjacent. If the substation is adjacent the existing electrical yard fencing and pad to be extended to include the new substation.
4. The DBE will prepare and submit engineered plans for DSA and Solano Community College Review and approval. Submittals for District review to include at minimum drawing and specifications at SD, 50% CD, and 100%CD levels.
5. The switchgear will include meter system for monitoring and logging electrical loads throughout the campus that are connected to the 12kV distribution system. Hardware, software, communications, and programming will be provided as part of the scope of work for this project. Provide all required interconnecting copper and fiber optic cables between devices and campus network.
6. Structural drawings with calculations for seismic, wind load, and overturning moment shall be prepared and submitted for DSA review and approval. Structural design for the foundation and anchorage design will also be prepared and submitted for DSA review and approval. The structural design shall be coordinated with the electrical, mechanical, and civil design and installation details.
7. Perform civil work for new duct bank installation including removal and disposal of trees, shrubs, irrigation piping, and topsoil, saw cutting of existing pavement and concrete walkways, curbs, and gutters, trenching, backfill and resurfacing activity. Complete site development for the new substation's areas and perform excavation and grading in accordance with the soils report and geotechnical report recommendations. Provide fill and remove spoils from the site. Provide paving, site drainage, fencing, gates, hardscape, and landscape as required for the project.
8. Install new conduit duct banks, manholes, and pull boxes to interconnect the new 12kV switchgear feeders to the existing campus 12kV system.
9. Coordinate the design of the Substation #3 system with the Central Plant Replacement project.
10. Prepare the required power system studies and submit for District review and approval prior to release of the new switchgear for fabrication.
11. Test and commission the new switchgear and metering prior to cutting over existing loads to the new substations.
12. Schedule outages to cut over the existing campus loads to the new service and provide temporary power to maintain all campus services during cutovers and shutdowns.
13. Demolish the existing substation #3 and #4 equipment, conduit, and conductors in coordination with Campus personnel and Central Plant project.

14. Contractor responsible for selecting and working with manufacturers to meet the project completion dates.
15. Contractor responsible for all structural, geotechnical, and seismic engineering requirements.
16. Provide all labor and materials required to restore the site conditions (hardscape, landscape, irrigation, barriers, etc.) back to 'as found' conditions

The completed installation will provide new reliable and resilient substations that will serve the Campus needs and allow for system maintenance, construction, modifications and improvements and electrification of the campus for the next forty years.

PROJECT MANAGEMENT AND SCHEDULE

- Project management and engineering design:
  a. Prepare and submit project schedule for review and approval.
  b. Prepare and submit a schedule of values.
  c. For working documents such as schedule, meeting minutes, submittals, RFI's, ASI's, Field Instructions, directives, project tracking, assignment of responsibilities, COR logs, budget, contingency, and allowances utilize Procore (licensing provided by SCCD), or an approved document control system at cost to DBE.
  d. Final and authoritative documents such as answered RFI's, final ASI's, finalized Field Instructions, approved submittals and shop drawings, past meeting minutes and weekly lookahead schedules, closeout documents (training videos, Operation & Maintenance Manuals, Attic Stock, Warranty, Specifications) will be uploaded by Division, IOR and special inspection reports, daily logs, pictures taken on site will be uploaded and archived if not daily then at end of each week to the project plan set in Procore.
  e. Schedule and attend weekly meetings during design and construction phases,
  f. Identify and comply with all regulatory requirements. Prepare and submit the documents required by each reviewer.
  g. Coordinate all street closures with Campus facilities and Campus Police prior to any street work. Provide traffic control, barricades, steel plates, and other measures and traffic management required to safely install all underground utilities in the streets and parking lots.
  h. Meet with the District representatives to access the site, conduct site assessments, collect record documents, details and data on the existing installation, including all underground systems, to become familiar with existing and future planned power sources and loads that will be connected to the 12kV main service and its distribution feeders.
  i. Evaluate the existing load on both substations and future power requirements.
  j. Coordinate the Substation #3 design and work with the Central Plant Replacement project developer.

- The total design build effort including design development phase is expected to be completed within 24 months.

- DBE is responsible to provide all temporary utilities and facilities required for Contractor use during construction including job trailer, sanitation, power, communications, security, and other improvements. The cost for these temporary provisions for this project shall be included as part of the bid.

- Project schedule requirement:
  a. Design Development completion: 1-1/2 months from Notice To Proceed (NTP)
  b. 100% Construction Documents: 3-1/2 months from NTP
  c. Substation and switchgear submittals: 3 months from NTP
  d. District No Shutdown Periods: During Testing (DBE Selected will receive district schedule)
  e. Substantial Construction completion: August 31, 2024.
     1. Complete the remaining scope of work by September 30, 2024
  f. Project closeout: 24 months from NTP

Design -Builder is responsible for preparing and submitting the project schedule to the College in accordance with the requirements stated above and the Contract General Conditions.

REGULATORY REQUIREMENTS

The DBE team's design shall meet and comply with the requirements of this Design Build Performance Criteria and the requirements of the different Authorities and Agencies having jurisdiction for Solano Community College campus projects. A partial list of the Authorities, Agencies and Reviewers that the design build team shall coordinate with and gain approval from, including the following activities (as required):

- Scheduling and attending meetings
- Preparing design and construction presentations and submittals
- Responding to questions
- Completing and submitting required submissions in a timely manner
- Providing the necessary follow-up to ensure that recommendations or directions are appropriately addressed

Note this is not a comprehensive and complete list. The appropriate Authorities and Agencies may include municipal, county, state, regional or federal authority with which the project is involved. It is the responsibilities of the design build team to identify and confirm the required Authorities and Agencies which may require information or the filing of drawings, specifications, permits, etc., such as State Fire Marshal, Department of Water Resources, or any organization for code compliance in connection with the project.

Utilities Companies: PG&E

Local Fire Authority (LFA): The project must adhere to the Local Fire Authority as they will be the entity responding to any emergencies on the site. The design build team is responsible for meeting any local standards required by the LFA.

Division of State Architect, California: The design build team must submit plans for ACS, FLS, and structural review and approval.

Certified Access Specialist (CASp): Required to certify pedestrian crossings for accessibility compliance.

Storm Water Pollution Prevention Plan (SWPPP): The design build team shall, as required by the Agencies having jurisdiction including State and County, furnish mitigation measures including but not limited to infiltration of runoff before it reaches the storm drain system, treatment of runoff to remove oil and petroleum hydrocarbons before it enters the storm drain system, and control of peak flow discharge to provide steam channel projection. State Water Board and the County of Solano requirements can be accessed on the Water Board website. For provision of these mitigation measures plans, calculations, maintenance requirements must be included in the Design Development phase deliverable, details of the mitigation facilities shall be included in the Construction Documents, and post-construction documentation required for the project SWPPP shall be provided prior and during Construction Administration.

Regional Water Quality Control Board (RWQCB): as required.

Regional Air Quality Control Board (RAQCB): as required.

County of Solano: As required.

BUILDING CODE CRITERIA

As of the writing of this Criteria Document, the 2019 California Building Standards Code (Title 24, C.C.R.) and its amendments are in effect. Actual code in effect at time of plan submittal shall be used for all design and construction.

Part 1	2019 California Building Standards Administrative Code
Part 2	2019 California Building Code (CBC)
Part 3	2019 California Electrical Code (CEC)
Part 4	2019 California Mechanical Code (CMC)
Part 5	2019 California Plumbing Code (CPC)
Part 6	2019 California Energy Code
Part 9	2019 California Fire Code (CFC)
Part 11	2019 California Green Building Standards Code (CAL Green)
Part 12	2019 California Referenced Standards Code
Part 13	2019 NFPA Fire Code

Partial list of NFPA Standards as referenced at CBC Chapter 35 for California Fire Marshal (SFM) (See CBC Chapter 35 for complete list of referenced NFPA Standards and Amendments):

NFPA 17	Dry Chemical Extinguishing Systems (2017 ED)
NFPA 30	Flammable and Combustible Liquids Code (2018 ED)
NFPA 72	National Fire Alarm and Signaling Code (2019 ED with California Amendments)

NFPA 80	Fire Doors and Other Opening Protectives (2019 ED)
NFPA 101	Life Safety Code (2018 ED)
NFPA 105	Standard for the Installation of Smoke Door Assemblies and Other Opening Protectives (2019 ED)
NFPA 170	Standard for Fire Safety and Emergency Symbols (2018 ED)
NFPA 252	Standard Methods of Fire Tests of Door Assemblies (2017 ED)

See CBC Chapter 35 for complete list of amendments to ASTM and UL Standards. Title 19 C.C.R. State Fire Marshal Regulations (Partial List, Title 19):

UL 464	Audible Signal Appliances (2016)
UL 521	Heat Detectors for Fire Protective Signaling Systems (1999 ED)
UL 1971	Signaling Devices for the Hearing Impaired (2002 ED)

STANDARDS AND GUIDELINES

See project plans and specifications for the industry standards and guidelines that are applicable to this project, including ANSI, ASHRAE, ASTM, IEC, IEEE, NEMA, NETA, CAL-OSHA and others.

(2020) Seismic Requirements

12kV Switchgear Sequence of Operations Overview

The DBE shall provide third party testing, commissioning, and training services of the installed system. Training shall be programmed and coordinated into the Construction Schedule. Training shall occur after equipment is commissioned and before it is placed into active service. Provide the College representative three weeks advance notice to witness the testing and commissioning of the equipment and to coordinate with the District personnel of training sessions.

Testing shall be performed in accordance with project specifications, and Campus approved NETA member testing firm with certified Level IV technician assigned to this project. ANSI/NETA Standard for Acceptance Test Specifications for Electrical Power Equipment and Systems shall be referenced for all testing requirements.

Field commissioning and performance testing of all equipment operation shall be coordinated and supervised by the project Design-Build Contractor Commissioning Agent in accordance with ANSI/NETA Standards and project specifications and the CxA for each system.

The design build contractor shall submit testing and commissioning plans for approval prior to implementation. Commissioning activity will be witnessed by Campus IOR, Campus Representatives and Project EOR. After all testing and commissioning activities are completed and accepted, provide the testing report and commissioning reports as required for project closeout.

Equipment and systems training sessions shall be presented by each major equipment manufacturer as detailed in the project specifications, for all systems. Training shall include written material specific to this project, that includes operating manual references, regular maintenance and scheduled service requirements for inspection, proper operation checklist, measured and metered values and adjustments, tolerances, and replacement of renewable parts, fluids, or lubrication. Training will include hands-on operation of the new substations systems prior to cutover of existing campus loads so that the equipment operating conditions can be simulated without interruption of existing campus loads. DBE will film the training and will upload the training video with training materials into Procore project plan set by divisions. Provide three copies of complete digital electronic file with table of contents in PDF format on DVD or solid-state media. Provide one paper binder of training materials with table of contents for Electric Shop.

APPENDICES

Project Performance Specifications List

DBE team to provide project specifications in conformance with the District provided "District Standards" with the exception of the following Supplemental Specifications issued with this RFQ/P.

DIVISION 26 – ELECTRICAL

- SECTION 26 11 16.11, SECONDARY UNIT SUBSTATIONS – SECONDARY LESS THAN 1000 V
- SECTION 26 12 13.01, LIQUID FILLED, MEDIUM VOLTAGE UNIT SUBSTATION TRANSFORMERS
- SECTION 26 13 16-13, MEDIUM VOLTAGE LOAD INTERRUPTER SWITCHGEAR
- SECTION 26 24 13.11, SWITCHBOARDS LOW VOLTAGE (GROUP MOUNTED FEEDERS - POW-R-LINE C)

Project Plans

E- 0.0	COVER SHEET
E- 0.1	ABBREVIATIONS AND SYMBOLS LEGEND
E- 1.0	OVERALL SITE POWER PLAN
E- 1.1	Electrical Partial Site Plan (Substation #3)
E- 1.2	Electrical Partial Site Plan (Substation #3 – Option 2)
E- 4.1	Electrical Substation #3 Plan
E- 4.2	Electrical Central Plant Floor Plan
ED- 4.3.1	Electrical Substation #4 Plan - Demo
E- 4.3.1	Electrical Substation #4 Plan - New
ED- 4.3.2	Electrical Substation #4 Plan – (Option 2 – Demo)
E- 4.3.2	Electrical Substation #4 Plan – (Option 2 – New)
ED- 7.1	Electrical Single Line Diagram – Demo
E- 7.1	Electrical Single Line Diagram – New
ED- 7.2	Electrical Single Line Diagram – Demo (Substation #3 – Option 2)
E- 7.2	Electrical Single Line Diagram – Demo (Substation #3 – Option 2)

SOLANO COMMUNITY COLLEGE DISTRICT
2013 FACILITIES MASTER PLAN

BOOK 2: DISTRICT STANDARDS

BOARD APPROVED APRIL 2, 2014
PUBLISHED MAY 30, 2014
REVISED PER BOARD APPROVED REVISIONS FEBRUARY 15, 2015
MARCH 16, 2016, FEBRUARY 21, 2018 AND APRIL 3, 2019

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PART III DISTRICT STANDARDS

Overview

SCCD has established standards for design and construction to ensure equity and consistency in facilities and for efficiency in operations and maintenance. The Standards consist of Design Standards that are directives and information that Design Consultants should incorporate into their contract documents (drawings and specifications). A few disciplines have also provided Construction Specifications and Typical Details, which should be customized to the design project.

These Standards were developed by the District, with intensive input from District Facilities, Maintenance and Operations personnel, in addition to IT personnel and the Security shared governance Committee for relevant sections. The Standards are based on prior experience at the District and the best practices from other California Community Colleges, and the products selected were carefully evaluated based on criteria that included aesthetics & user comfort, durability, ease of maintenance, sustainable properties/practices and cost.

Standards Process

These Design Standards are a tool to clarify direction and streamline project execution for design professionals, construction managers and other participants in capital improvement projects. They represent the District's "strong preference" and should be applied, when possible, without compromising the creativity of the overall design. Final disposition, color, size, product choice etc. should conform to the best extent possible where equivalent substitutes are allowed in the Design Standard. If equivalent substitutes are allowed only "if performance and quality equivalency can be evidenced" or the consultant wishes to deviate from the written design standards for other reasons, then the consultant needs to provide evidence/justification and seek District approval as outlined below.

In all cases the written design standards do not diminish or eliminate the standard of care owed by the consultant to SCCD or relieve, in any manner whatsoever, a consultant from any professional responsibility, duty or due diligence required toward that work.

These Design Standards should be incorporated into all Solano Community College ("SCC", the "College") projects. Projects include but are not limited to new construction, Tenant Improvements (TI) projects, remodels, and renovations. It is understood that the College could not attempt to upgrade and retrofit all campus facilities in a single massive construction project; such a process would be prohibitively costly and disruptive. Rather, the strategy is for installations to be implemented continually and concurrently in a phased manner, over time and as funding allows, toward a goal of all campuses and campus buildings eventually meeting the same consistent Design Standards.

Design Standards Process:

The following Design Standards Process Guidelines incorporation and approval process provides procedural guidelines to ensure that project-specific design and contractor teams submit and receive approval by authorized SCCD departmental and administrator personnel at defined milestones. This allows for SCCD review, input, and approval as well as documentation of any approved deviations or variances to the Design Standards early in the design process.

Approved deviations and variances from the Design Standards should be conscious and justifiable, provide a solution for a site-specific need or replace outdated/obsolete requirements, and be compatible with other Design Standards. Proposed deviations shall be submitted to SCCD in writing for review and approval prior to incorporation into the project. Approved deviations may be project-specific or permanent; if an approved deviation or variance is intended to be permanent the change should be reflected in the associated Design Standard.

Review and Approval

Review and approval by SCCD is required at the conclusion of each of the design phases listed below prior to progressing to the next phase. Documentation required for review includes project drawings and specifications; manufacturer cutsheets, diagrams, and other product data; associated progress cost estimates and written identification of deviations/variances from District Standards Not all projects will include all phases.

Schematic Design

Design professionals should become familiar with the Architectural, Landscape, Sustainability and other Guidelines (found in Book 1 of the Facilities Master Plan) and the District Standards (found in this Book 2 and the Facilities Website) prior to initiating the design process. While most of the specifics within the District Standards will be reflected in future design phases, there are some aspects reflected in the District Standards that require consideration from the onset of the design process. If any deviations/variations are apparent at this early phase, bring them to District attention for consideration.

Deliverables of this phase are as stipulated in the Contract with the District. In addition for system designs such as Electronic Security and Safety, Fire Alarm etc. provide the following: a written design narrative which describes planned system elements by function and overall design. The narrative should include conceptual device and system floor plan, site layout drawings and functional/operational project planning.

Design Development

This is the phase where the specifics within the Design Standards will need to be reflected and coordinated within the specific project, and any required deviations/variances should be apparent during this phase. Bring all deviations/variances to District attention, in written format, for evaluation and action as soon as they are determined. Do not assume deviations/variations will be apparent to District personnel during their documentation review towards the end of this phase.

Deliverables of this phase are as stipulated in the Contract with the District. In addition for system designs such as Electronic Security and Safety, Fire Alarm etc. provide the following: refinement of schematic design conceptual elements to provide a greater level of detail of system floor plan, functional/operational project planning and site layout drawings as well as required supporting components such as physical, electrical, MEP, data network, etc.

Construction Documents

By this phase the deviations/variances should have already been resolved. If coordination and detailing efforts during this phase require previously unknown deviations/variances from District Standards, bring them to District attention, via written format, for evaluation and action as soon as they are determined.

Deliverables of this phase are as stipulated in the Contract with the District. In addition for system designs such as Electronic Security and Safety, Fire Alarm etc. provide the following: design drawings indicating location, installation details, cabling and interfaces for elements approved in the schematic design and design development phases. This phase includes written device and systems specifications in the current MasterFormat edition as issued by the Construction Specifications Institute. These specifications should clearly describe interfaces between systems or assemblies and interfaces to any other equipment and systems under other Design Standards.

Project Close-Out

Deliverables of this phase are as stipulated in the Contract with the District. District should endeavor to update District Standards for any deviations or variances that were approved as permanent during that particular project.

Landscape Standards

DESIGN STANDARD for Benches

Purpose:

The purpose of this document is to standardize the benches used throughout the campus. This design standard achieves the purpose of ensuring the quality of maintenance, reliability, and aesthetic value of these objects on campus.

Design Standard:

- Set back at least 24” from pedestrian walkway
- Place by other amenities such as bus shelters, kiosks, newsstands, waste receptacles, etc.
- Place along pedestrian walkways
- Should be located to give people a choice between sun and shade, and protected from elements like wind
- Use backless benches in park-like areas individually or in clusters
- Use benches with back in lower traffic areas along primary and secondary pedestrian routes, plazas and main building entryways
- Benches should be located on concrete paving, interlocking pavers, or asphalt

Approved Manufacturers:

- Landscape Forms.
    - Model: 72” Scarborough Bench, Horizontal Strap with Back or 72” Scarborough Bench, Horizontal Strap Backless.
    - Color: Powdercoated stormcloud
    - Mounting: Surface mounted
    - Phone: (269) 381-0396
    - Web: Landscapeforms.com

Substitutes Allowed:

Approved manufacturer or approved equal.

Associated Design Standards and Construction Specifications

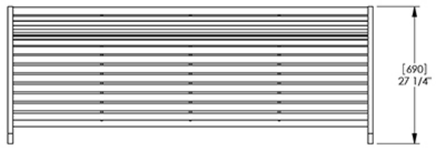
Install per manufacturer’s specifications.

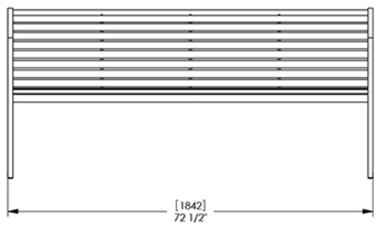
Scarborough™

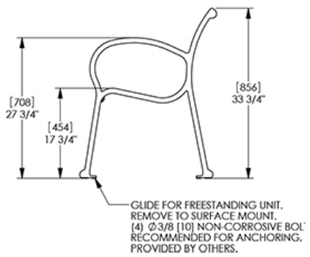
Bench, 72" Backed, with Horizontal Strap Seat

landscapeforms®

www.landscapeforms.com Ph: 800.521.2546





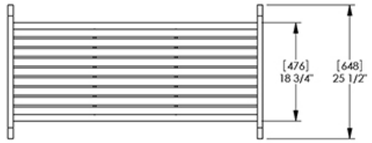


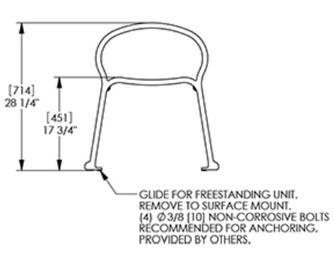
Scarborough™

Bench, 48" Backless, with Horizontal Strap Seat

landscapeforms®

www.landscapeforms.com Ph: 800.521.2546





DESIGN STANDARD for Bike Racks & Bike Lockers

Purpose:

The purpose of this document is to standardize the benches used throughout the campus. This design standard achieves the purpose of ensuring the quality of maintenance, reliability, and aesthetic value of these objects on campus.

Design Standard:

- Place near building entrances along bike paths
- At least 5’ from crosswalk or fire hydrant
- Minimum 2’ from curb
- Minimum 3’ from street furniture, light poles, parking meters, trees, and other objects
- 3’ from wall if perpendicular to wall
- 3’ from wall if parallel to wall
- Single loop or five loop racks recommended
- Install number of bike racks and lockers per CalGreen Standards

Approved Manufacturers:

- Bike Lockers
    - Manufacturer: Dura Bike Locker, durabikelocker.com
    - Phone: (916) 488-7026
    - Model: DBLP Pie Shaped Bicycle Locker
    - Color: Galvanized steel, powder coat graphite with bike symbol wall perforation
    - Mount: In ground
- Bike Lockers
    - Manufacturer: Bikeparking.com
    - Phone: (415) 333-6428
    - Style: Welle Multiple Bend Round Pipe
    - Color: Powder coat silver metallic
    - Mount: In ground

Substitutes Allowed:

Approved manufacturer or approved equal

Associated Design Standards and Construction Specifications

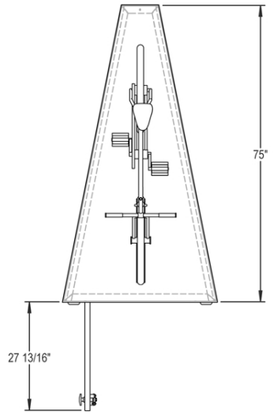
Install per manufacturer’s specifications

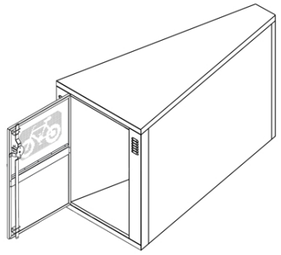
DURA BIKE LOCKER

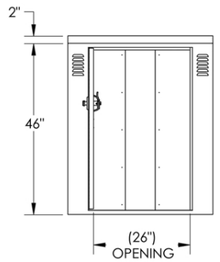
A DIVISION OF HANNAN SPECIALTIES INC.

Made in the USA

DIMENSION SHEET FOR
MODEL : DBLP
Pie Shaped Bicycle Locker



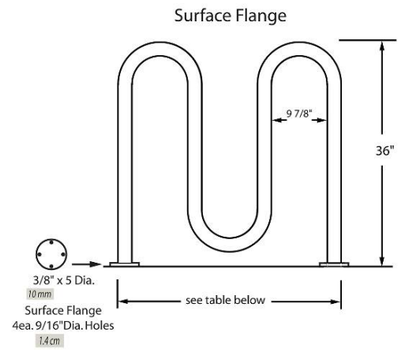


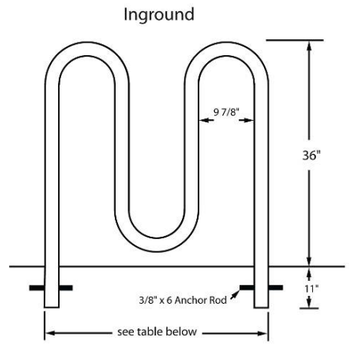


www.durabikelocker.com

4019 LEOS LN. #3 - CARMICHAEL, CA 95608

(916) 488-7026 - (800) 722-BIKE (2453)





WELLE™ MULTI BEND ROUND PIPE RACKS

Mount :
-SF
(Surface Flange)
-IG
(Inground)

Finish :
-G
(Galvanized)
-P
(Powder Coated)
-SS
(Stainless Steel)

Material :
2 3/8" O.D. Pipe
6.03 cm
ASTM A53
Schedule 40 Pipe
.154"Wall Thickness
Mandrel - Bent

Optional :
Stainless 304
Alloy Available

Item	# of Bends	Bike Capacity	Common		Wide Loop		Model
			Length	Weight	Length	Weight	
H3605	3	5	38" 96 cm	60 lbs 27 kg	59" 150 cm	65 lbs 29 kg	
H3607	5	7	62" 157 cm	80 lbs 36 kg	97" 246 cm	90 lbs 41 kg	
H3609	7	9	86" 218 cm	120 lbs 54 kg	135" 343 cm	130 lbs 59 kg	
H3611	9	11	110" 279 cm	135 lbs 61 kg	173" 439 cm	150 lbs 68 kg	
H3613	11	13	134" 340 cm	155 lbs 70 kg	211" 536 cm	180 lbs 81 kg	
H3615	13	15	158" 401 cm	180 lbs 81 kg	249" 632 cm	215 lbs 97 kg	
H3617	15	17	182" 462 cm	205 lbs 92 kg	287" 729 cm	245 lbs 110 kg	

09.18.2013

DESIGN STANDARD for Bollards

Purpose:

The purpose of this document is to standardize the use of bollards used on campus. This design standard achieves the purpose of ensuring the quality of maintenance, reliability, and value of these objects on campus.

Design Standard:

- Maximum spacing 8’ on center, minimum 4’ on center
- Permanent bollards are used to restrict vehicular access at gates and entryways
- Removable bollards may be installed where occasional vehicle access is required, such as service roads
- Should be used anywhere pedestrian pathways meet vehicular traffic

Approved Manufacturers:

Reliance Foundry Co., LTD.

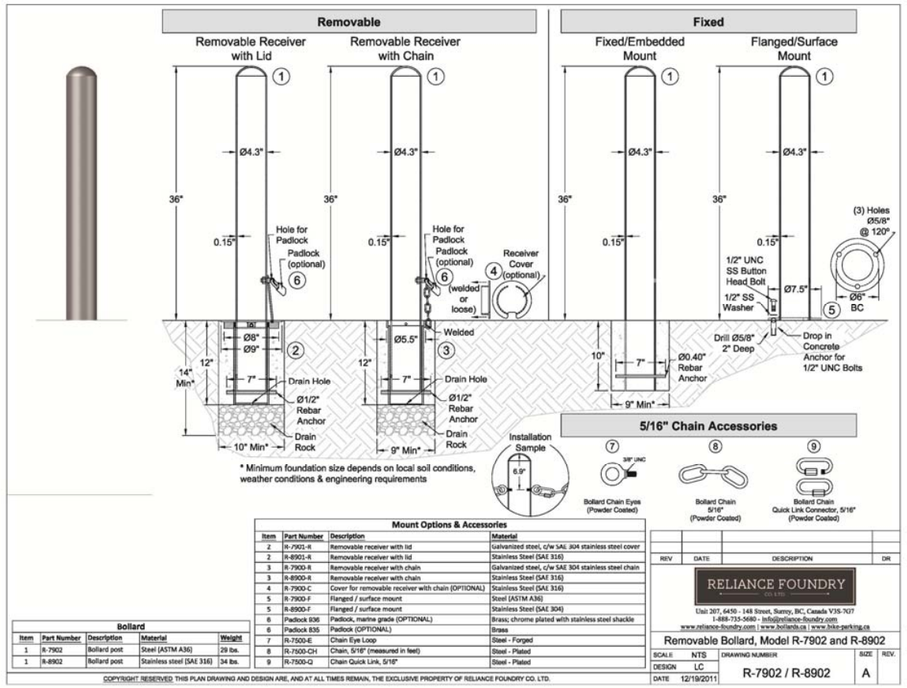
- Model: R-7902 Removal Steel Bollard
- Color: Bengal Silver
- Mounting: Embedded receiving with lids
- Phone: (604)592-4333
- Website: Reliance-foundry.com

Substitutes Allowed:

Approved manufacturer or approved equal.

Associated Design Standards and Construction Specifications

Install per manufacturer specifications.



DESIGN STANDARD for Decomposed Granite Pathways

Purpose:

The purpose of this document is to standardize paths made of decomposed granite. This design standard achieves the purpose of ensuring the quality of maintenance, reliability, and aesthetic value of these paths on campus.

Design Standard:

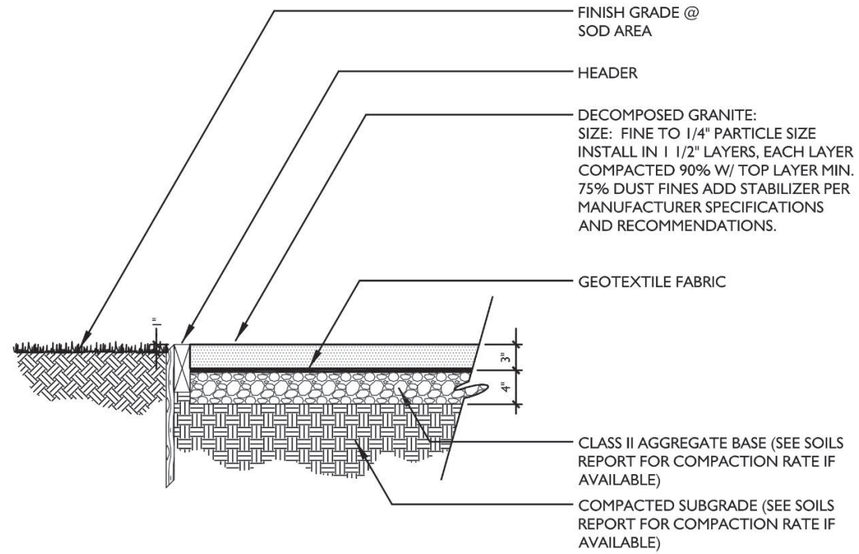
- Install with commercial binder
- Install away from entry doors to prevent spread of fines into buildings and classrooms
- Do not use on paths adjacent to buildings or lawns where materials can migrate onto lawns or building entry systems

Approved Manufacturers:

- Colors: California Gold and Graphite Grey only
- Stabilizer: Technisoil G3 commercial

Associated Design Standards and Construction Specifications

See decomposed granite detail.



DECOMPOSED GRANITE PAVING

SCALE: 3/4" = 1'-0"

DESIGN STANDARD for Irrigation

Purpose:

The purpose of this document is to standardize the irrigation procedures and design on campus. This design standard achieves the purpose of ensuring the quality of maintenance, reliability, and efficiency of these systems on campus

Design Standard:

- Irrigation systems shall be designed to prevent runoff, low head drainage, overspray or other similar conditions.
- All irrigation systems should be designed, managed and maintained to meet or exceed 70% efficiency.
- Sprinklers, drip irrigation and bubblers must be on separate valves. Overhead sprinkler irrigation should only be used for turf areas.
- Subsurface or low volume irrigation must be used when turf is be planted on slopes greater than 25% or in areas that are less than 8' wide
- Controllers must use evapotranspiration or soil moisture data
- Overhead irrigation is not permitted within 24" of non-permeable surfaces unless there is an alternate design or technology to prevent runoff or unless the overspray runoff flows into landscaping
- See Irrigation Notes
- Note that Fairfield Campus and Vacaville Center use non potable water supplied by the Solano Irrigation District (SID) unfiltered. For the Fairfield Campus, there is a filtration system at the pump station. At the Vacaville Center, there is an in-line filter. City water is utilized for irrigation at Vallejo Center.

Approved Manufacturers:

- See Irrigation Legend

Substitutes Allowed:

None

Associated Design Standards and Construction Specifications

Model Water Efficient Landscape Ordinance AB 1881

IRRIGATION NOTES

1. THIS DESIGN IS DIAGRAMMATIC. ALL PIPING, VALVES, ETC. SHOWN WITHIN PAVED AREAS IS FOR DESIGN CLARIFICATION ONLY AND SHALL BE INSTALLED IN PLANTING AREAS WHERE POSSIBLE. AVOID ANY CONFLICTS BETWEEN THE SPRINKLER SYSTEM, PLANTING AND ARCHITECTURAL FEATURES.

2. DO NOT WILLFULLY INSTALL THE SPRINKLER SYSTEM AS SHOWN ON THE DRAWINGS WHEN IT IS OBVIOUS IN THE FIELD THAT OBSTRUCTIONS, GRADE DIFFERENCES OR DIFFERENCES IN THE AREA DIMENSIONS EXIST THAT MIGHT NOT HAVE BEEN CONSIDERED IN THE ENGINEERING. SUCH OBSTRUCTIONS OR DIFFERENCES SHOULD BE BROUGHT TO THE ATTENTION OF THE OWNER'S AUTHORIZED REPRESENTATIVE. IN THE EVENT THAT THIS NOTIFICATION IS NOT PERFORMED, THE IRRIGATION CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY REVISIONS NECESSARY.

3. IT IS THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR TO FAMILIARIZE HIMSELF WITH ALL GRADE DIFFERENCES, LOCATION OF WALLS, RETAINING WALLS, ETC. HE SHALL COORDINATE HIS WORK WITH THE GENERAL CONTRACTOR AND OTHER SUBCONTRACTORS FOR THE LOCATION AND THE INSTALLATION OF PIPE SLEEVES THROUGH WALLS, UNDER ROADWAYS, PAVING, STRUCTURES, ETC.

4. DUE TO THE SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE ALL OFFSETS, FITTINGS, SLEEVES, ETC., WHICH MAY BE REQUIRED. THE CONTRACTOR SHALL CAREFULLY INVESTIGATE THE STRUCTURAL AND FINISHED CONDITIONS AFFECTING ALL OF HIS WORK AND PLAN HIS WORK ACCORDINGLY, FURNISHING SUCH FITTINGS, ETC., AS MAY BE REQUIRED TO MEET SUCH CONDITIONS. DRAWINGS ARE GENERALLY DIAGRAMMATIC AND INDICATIVE OF THE WORK TO BE INSTALLED. THEN WORK SHALL BE INSTALLED IN SUCH A MANNER AS TO AVOID CONFLICTS BETWEEN IRRIGATION SYSTEMS, PLANTING, AND ARCHITECTURAL FEATURES.

5. ELECTRICAL CONTRACTOR TO SUPPLY 120 VOLT A.C. (2.5 AMP) SERVICE TO CONTROLLER LOCATION. IRRIGATION CONTRACTOR TO MAKE FINAL CONNECTION FROM ELECTRICAL STUB-OUT TO CONTROLLER.

6. EACH CONTROLLER SHALL HAVE ITS OWN INDEPENDENT GROUND WIRE.

7. SPLICING OF 24 VOLT WIRE WILL NOT BE PERMITTED EXCEPT IN VALVE BOXES. LEAVE A 36 INCH COIL OF EXCESS WIRE AT EACH SPLICE AND 100 FEET ON CENTER ALONG WIRE RUN

8. AT THE VACAVILLE CENTER, 2-WIRE CABLE BETWEEN CONTROLLER AND DECODERS SHALL BE PAIGE P7350D 14 AWG SOLID COPPER JACKETED 2-CONDUCTOR DIRECT BURIAL CABLE. 2-WIRE CABLE BETWEEN DECODERS AND SOLENOIDS SHALL BE PAIGE P7351D DTS 14 AWG SOLID COPPER JACKETED 2-CONDUCTOR DIRECT BURIAL CABLE.

9. THE IRRIGATION CONTRACTOR SHALL FLUSH AND ADJUST ALL SPRINKLER HEADS FOR OPTIMUM PERFORMANCE AND TO PREVENT OVERSPRAY ONTO WALKS, ROADWAYS AND/OR BUILDINGS AS MUCH AS POSSIBLE. THIS SHALL INCLUDE SELECTING THE BEST DEGREE OF ARC TO FIT THE EXISTING SITE CONDITIONS AND TO THROTTLE THE FLOW CONTROL AT EACH VALVE TO OBTAIN THE OPTIMUM OPERATING PRESSURE FOR EACH SYSTEM.

10. NOTIFY ARCHITECT OF ANY ASPECTS OF LAYOUT WHICH WILL PROVIDE INCOMPLETE OR INSUFFICIENT WATER COVERAGE OF PLANT MATERIAL AND DO NOT PROCEED UNTIL HIS INSTRUCTIONS ARE OBTAINED.

11. ALL SPRINKLER HEADS SHALL BE SET PERPENDICULAR TO FINISH GRADE OF THE AREA TO BE IRRIGATED UNLESS OTHERWISE DESIGNATED ON THE PLANS.

12. SPRINKLERS WHERE LOW HEAD DRAINAGE WILL CAUSE EROSION AND EXCESS WATER USE A POP-UP BODY WITH INTEGRAL CHECK VALVE.

13. THE SPRINKLER SYSTEM DESIGN IS BASED ON THE NORMAL OPERATION PRESSURE SHOWN ON THE IRRIGATION DRAWINGS. THE IRRIGATION CONTRACTOR SHALL VERIFY WATER PRESSURE PRIOR TO CONSTRUCTION. REPORT ANY DIFFERENCE BETWEEN THE WATER PRESSURE INDICATED ON THE DRAWINGS AND THE ACTUAL PRESSURE READING AT THE IRRIGATION POINT OF CONNECTION TO THE OWNER'S AUTHORIZED REPRESENTATIVE. TEST USING MAXICOM CENTRAL CONTROLS AT EACH SITE.

14. OPERATE IRRIGATION CONTROLLER(S) BETWEEN THE HOURS OF 9:00 PM AND 7:00 AM.

15. IRRIGATION CONTRACTOR TO NOTIFY ALL LOCAL JURISDICTIONS FOR INSPECTION AND TESTING OF INSTALLED BACKFLOW PREVENTION DEVICE.

16. PRIOR TO TRENCHING, CALL UNDERGROUND SERVICE ALERT, (1-800) 642-2444 FOR NORTHERN CALIFORNIA. ALSO CALL DISTRICT STAFF PERSON KELLY TRUJILLO, (707) 580-6598).

17. WHEN VERTICAL OBSTRUCTIONS (STREET LIGHTS, TREES, FIRE HYDRANTS, ETC.) INTERFERE WITH THE SPRAY PATTERN OF THE HEADS SO AS TO PREVENT PROPER COVERAGE, THE IRRIGATION CONTRACTOR SHALL FIELD ADJUST THE SPRINKLER SYSTEM BY INSTALLING A QUARTER, THIRD OR HALF CIRCLE HEAD AT THE SIDES OF THE OBSTRUCTION SO AS TO PROVIDE PROPER COVERAGE. ALL ADJUSTMENTS SHALL BE MADE AT NO ADDITIONAL COST

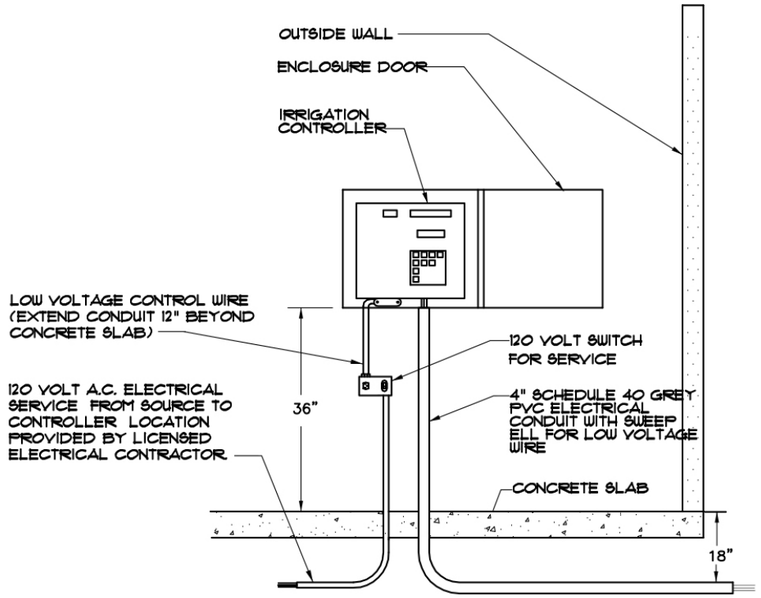
18. WHERE IT IS NECESSARY TO EXCAVATE ADJACENT TO EXISTING TREES, THE CONTRACTOR SHALL USE ALL POSSIBLE CARE TO AVOID INJURY TO TREES, AND TREE ROOTS. EXCAVATION IN AREAS WHERE TWO (2) INCH AND LARGER ROOTS OCCUR SHALL BE DONE BY HAND. ROOTS TWO (2) INCHES AND LARGER IN DIAMETER SHALL BE WRAPPED IN A PLASTIC BAG AND SECURED WITH A RUBBER BAND. TRENCHES ADJACENT TO TREE SHOULD BE CLOSED WITHIN TWENTY-FOUR (24) HOURS; WHERE THIS IS NOT POSSIBLE, THE SIDE OF THE TRENCH ADJACENT TO THE TREE SHALL BE KEPT SHADED WITH BURLAP OR CANVAS.

19. STATIC PRESSURE AT POINT OF CONNECTION IS ALL DEPENDENT UPON LOCATION. TEST AND VERIFY.

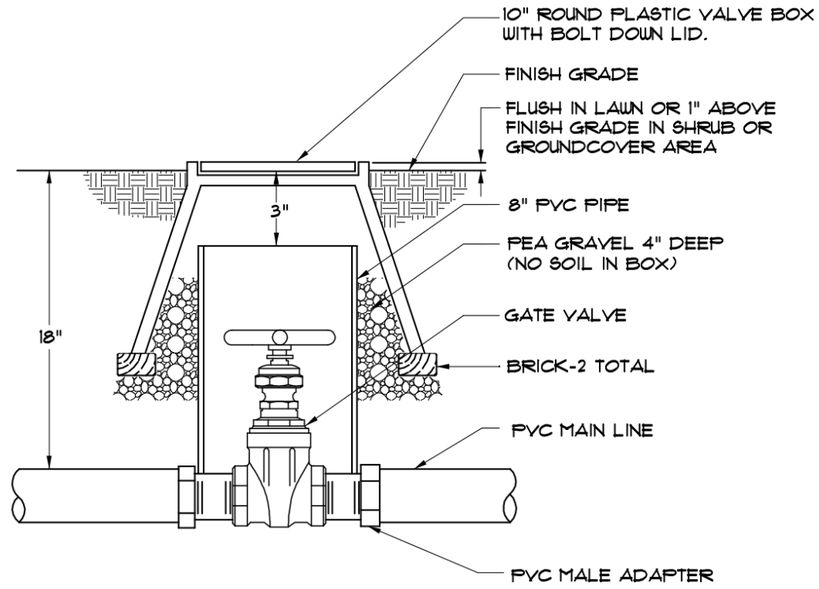
20. ALL IRRIGATION VALVE BOXES SHALL BE PURPLE FOR USE WITH RECYCLED WATER AND LOCATED WITHIN GROUNDCOVER AREAS ONLY. DO NOT LOCATE VALVES AT PEDESTRIAN ENTRY POINTS OR AT PEDESTRIAN CHANGE OF DIRECTION.

IRRIGATION LEGEND

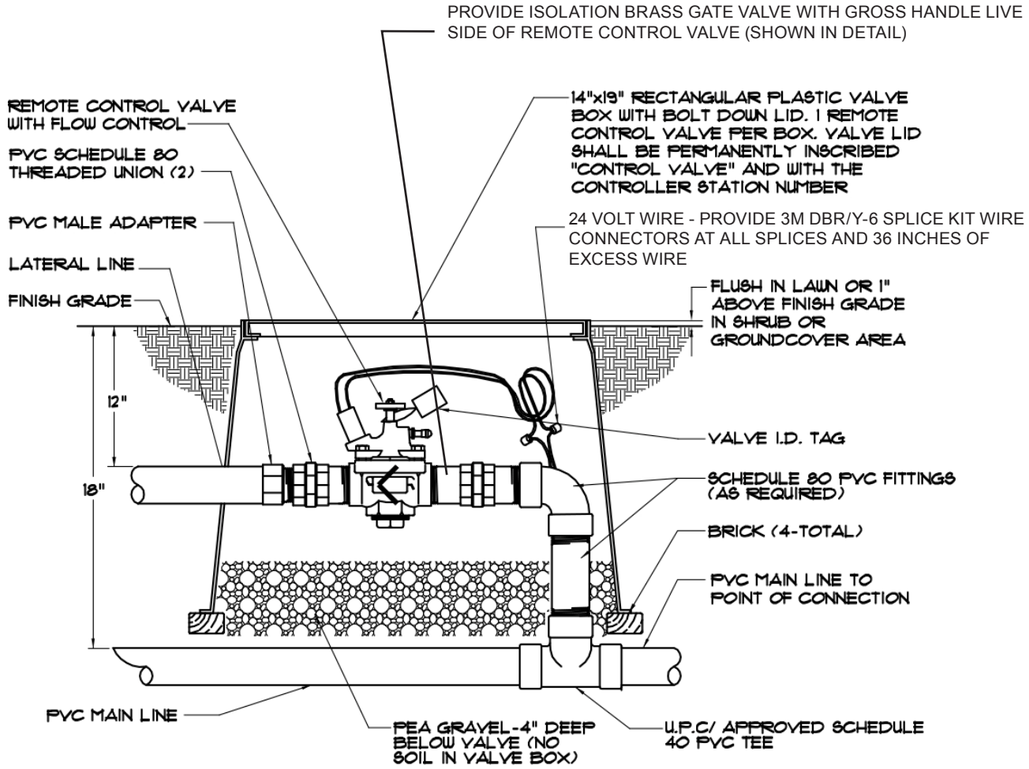
DESCRIPTION	MODEL NUMBER	PSI	GPM	RADIUS
HUNTER POP-UP ROTOR SPRAY WITH PURPLE COVER FOR TURF, STAINLESS STEEL	I-40 SERIES, I-20 SERIES, PGP SERIES	50	VARIES	VARIES
RAINBIRD 4" POP-UP SPRAY HEAD WITH PRECISION SERIES NOZZLES	RAINBIRD 1806 SAM	30	3.5, 1.65, .85, 2.1	15'
RAINBIRD 4" POP-UP SPRAY HEAD WITH PRECISION SERIES NOZZLES		30	2.2, 1.1, .58, 1.5	12'
RAINBIRD 4" POP-UP SPRAY HEAD WITH PRECISION SERIES NOZZLES		30	1.5, .75, .33, 1.5	18'
RAINBIRD 4" POP-UP SPRAY HEAD WITH PRECISION SERIES NOZZLES		30	.58, .25, .75	8'
RAINBIRD SWING JOINT FOR ALL TURF HEADS	TSJ SWING JOINT, ¾" & 1"			
RAINBIRD ROOT WATERING SYSTEM -- TREES	RWS-BC-1402	30	.58	-
GREENFIELD BRASS REMOTE CONTROL VALVE	2800 SERIES			
NIBCO BRONZE GATE VALVE (LINE SIZE) IN ROUND BOX	NIBCO CLASS 125			
RAINBIRD QUICK COUPLING VALVE WITH PURPLE VINYL LOCKING COVER	33DNP			
LOW VOLUME IRRIGATION SHALL BE: RAINBIRD DRIP SYSTEM COMPONENTS WITH PRESSURE REGULATOR AND FILTER/FLEAM-OUT ON EACH VALVE. 1.00 GPM EMITTERS, DRIPLINE PIPE WITH COMPRESSION FITTINGS INSTALLED 2" - 4" COVER BELOW SOIL.	XFS SUBSURFACE DRIP LINE WITH COPPER SHIELD TECHNOLOGY			
MAIN LINE: 4" DIAMETER AND LARGER C900 PVC PIPE. 2.5"- 3.5" DIAMETER CLASS 315 PURPLE PVC PLASTIC PIPE. FITTINGS SHALL BE SCHEDULE 80 PVC SOLVENT WELD. 18" COVER.				
LATERAL LINE: 1" - 2.5" SCHEDULE 40 PURPLE PVC PLASTIC PIPE WITH SCHEDULE 40 PVC SOLVENT WELD FITTINGS. 12" COVER.				
SLEEVE: 1120-SCHEDULE 40 PVC PLASTIC PIPE WITH SCHEDULE 40 PVC PLASTIC FITTINGS. 24" COVER UNDER ROADWAY PAVING, 18" COVER UNDER CONCRETE PAVING.				
RAINBIRD ESP SAT PLUS CONTROLLER WITH RADIO	MAXICOM 3rd INTERFACE BOARD			
RAINBIRD ESP SAT CONTROLLER PEDESTAL				
WIRE CONNECTION: 3M DBR/Y-6 DIRECT BURWIREY SPLICE KIT				



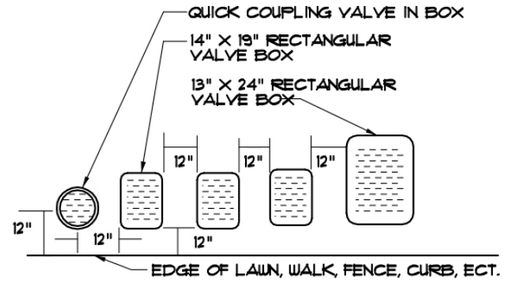
1 **WALL MOUNT CONTROLLER** (PEDESTAL ALSO ALLOWED)
NTS



2 **GATE VALVE INSTALLATION**
NTS



3 REMOTE CONTROL VALVE INSTALLATION
NTS



NOTES:

1. CENTER BOX OVER REMOTE CONTROL VALVE TO FACILITATE SERVICING VALVE.

2. SET BOXES 1" ABOVE FINISH GRADE OR MULCH COVER IN GROUND COVER/SHRUB AREA AND FLUSH WITH FINISH GRADE IN TURF AREA.

3. SET RCV AND VALVE BOX ASSEMBLY IN GROUND COVER/SHRUB AREA WHERE POSSIBLE. INSTALL IN LAWN AREA ONLY IF GROUND COVER DOES NOT EXIST ADJACENT TO LAWN.

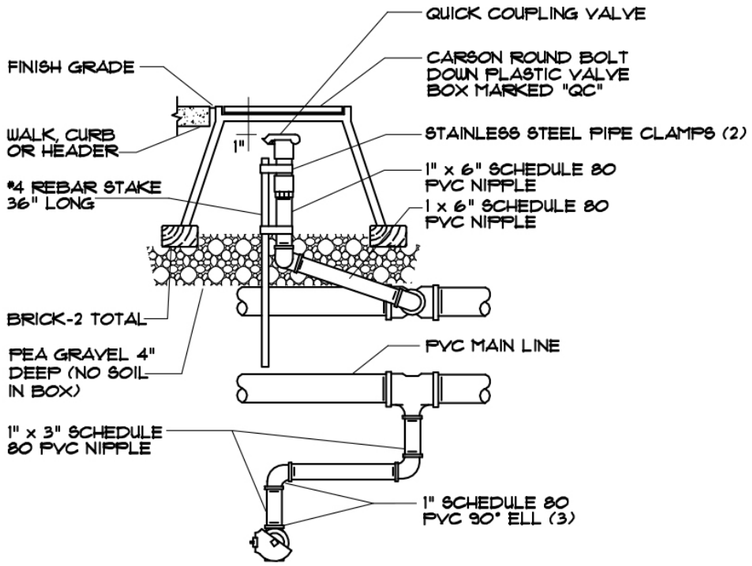
4. SET BOXES PARALLEL TO EACH OTHER AND PERPENDICULAR TO EDGE.

5. AVOID HEAVILY COMPACTING SOIL AROUND VALVE BOX EDGES TO PREVENT COLLAPSE AND DEFORMATION OF VALVE BOX SIDES.

6. ALL VALVE BOXES SHALL HAVE BOLT DOWN LIDS.

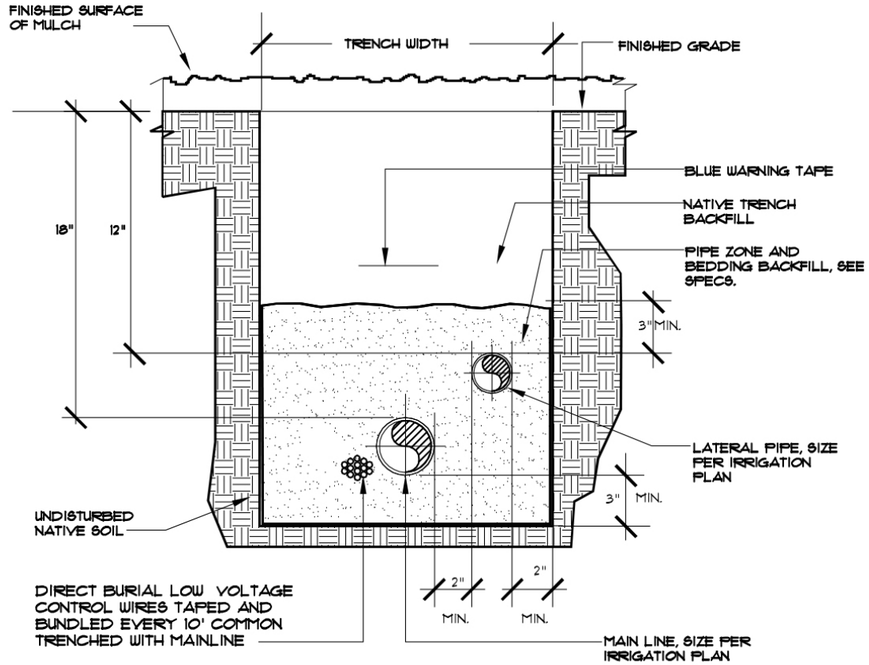
7. VALVE LID SHALL BE PERMANENTLY INSCRIBED “CONTROL VALVE” AND WITH THE CONTROLLER STATION NUMBER, AND BE PURPLE IN COLOR WHERE NON-POTABLE WATER IS USED.

4 VALVE BOX INSTALLATION
NTS



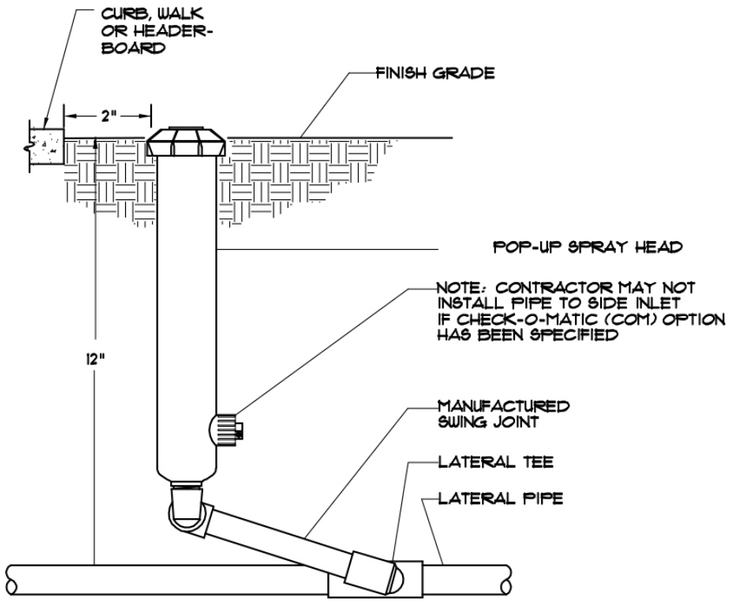
5 1" QUICK COUPLER IN BOX

NTS



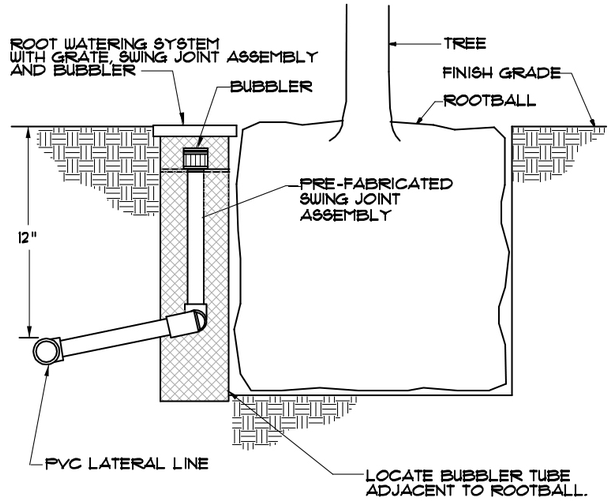
6 TYPICAL COMBINATION TRENCH

NTS



7 POP-UP SPRAY HEAD INSTALLATION

NTS



NOTES:

1. ONE BUBBLER PER TREE TO BE PLACED UPHILL SIDE OF ROOTBALL.

8 TREE BUBBLER INSTALLATION

NTS

DESIGN STANDARD for Site Lighting

Refer to Electrical Standards 265000 Lighting

DESIGN STANDARD for Pedestrian Asphalt Paving

Purpose:

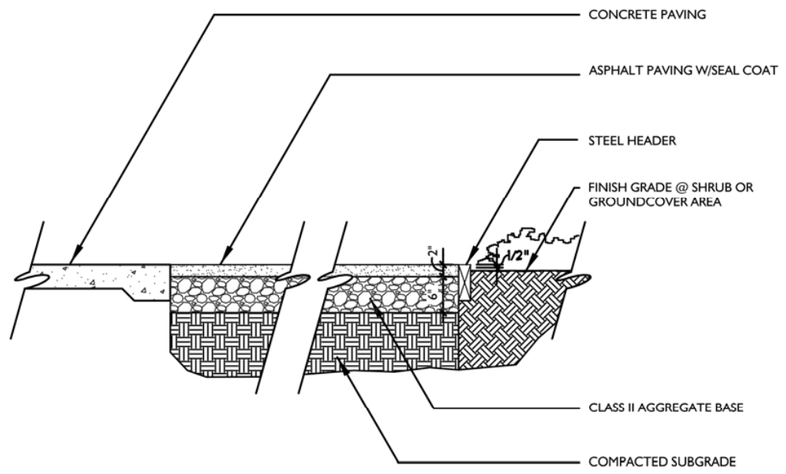
The purpose of this document is to standardize asphalt paving in pedestrian areas. This design standard achieves the purpose of ensuring the quality of maintenance, reliability, and safety of paving on campus.

Design Standard:

- To be used for secondary, tertiary or service paths and roads
- All asphaltic concrete to be restrained with metal header or min. 6” concrete mowband

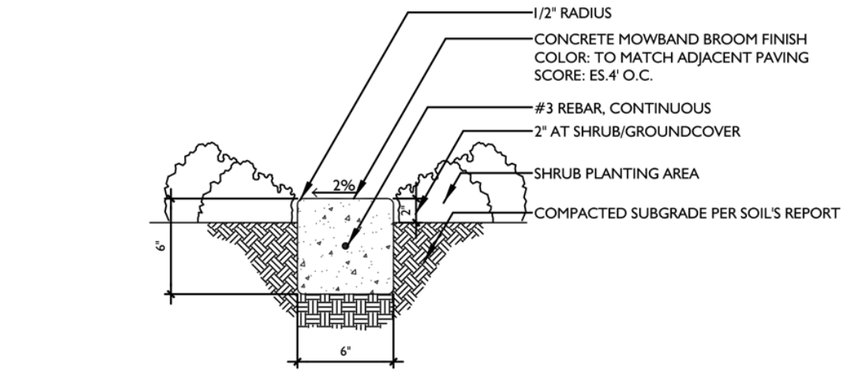
Associated Design Standards and Construction Specifications

- Asphaltic concrete to be 1/4 in. maximum aggregate, minimum course thickness: 2 in.
- Aggregate base to be Class 2 aggregate base 3/4 in. maximum aggregate size
- Nails shall be hot dipped galvanized
- Paving and base section to be designed to allow for light vehicular traffic where path/ road is wider than six feet.



PEDESTRIAN A.C. PAVING

SCALE: 1/2" = 1'-0"



6" CONCRETE MOWBAND

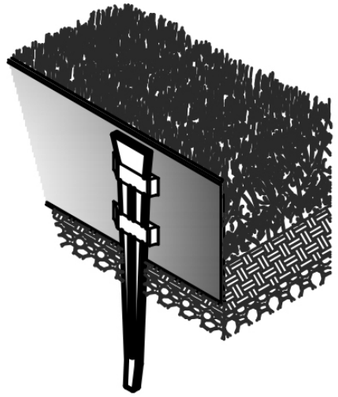
SCALE: 1" = 1'-0"

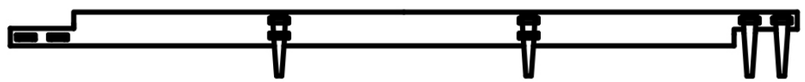
COL-MET.

COLLIER METAL SPECIALTIES LTD
3333 MILLER PARK SOUTH
GARLAND, TX 75042
TOLL FREE: 1-800-829-8225
PHONE: (972) 494-3900
FAX: (972) 494-1605
www.colmet.com

- [x] SIZE
- [ ] 10' x 4" x 14GA
- [ ] 10' x 4" x 12GA
- [ ] 10' x 4" x 1/8"
- [x] 10' x 4" x 3/16"
- [ ] 10' x 4" x 1/4"
- [ ] 10' x 5" x 3/16"
- [ ] 10' x 5" x 1/4"
- [ ] 10' x 6" x 14GA
- [ ] 10' x 6" x 12GA
- [ ] 10' x 6" x 1/8"
- [ ] 10' x 6" x 3/16"
- [ ] 10' x 6" x 1/4"

- [x] COLOR/FINISH
- [x] BLACK
- [ ] BROWN
- [ ] GREEN
- [ ] UNFINISHED GALVANIZED
- [ ] UNFINISHED RAW STEEL





NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. ALL DIMENSIONS ARE CONSIDERED TRUE AND REFLECT MANUFACTURER'S SPECIFICATIONS.
3. DO NOT SCALE DRAWING.
4. FOR ORDERING DIVIDE NUMBER OF FEET NEEDED BY 9.33 TO OBTAIN THE NUMBER OF 10' PEICES NEEDED.
5. CONTRACTOR'S NOTE: FOR PRODUCT AND COMPANY INFORMATION VISIT www.CADdetails.com/info REFERENCE NUMBER 1023-003.

1023-003

DESIGN STANDARD for Pedestrian Concrete Paving

Purpose:

The purpose of this document is to standardize concrete paving in pedestrian areas. This design standard achieves the purpose of ensuring the quality of maintenance, reliability, and safety of paving on campus.

Design Standard:

- 4” thick for Standard Pathways with rebar reinforcement
- #3 at 16” thick for paths with occasional vehicular traffic
- #4 @ 12” thick for fire truck access
- Poured-in-place concrete
- SRI Reflectance rating 0.3 minimum

Approved Manufacturers:

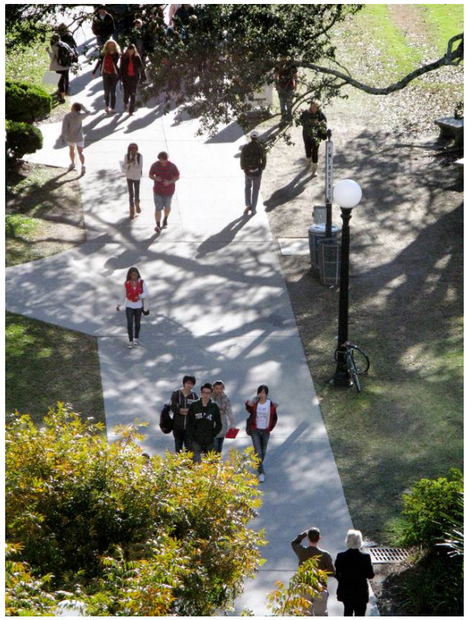
- L.M. Scofield Co. Chromix Admixture
    - Medium broom with 1 ½” troweled edge
    - No color specified
    - Phone: (800) 800-9900
- Portland Cement. ASTM C150, Type 1, natural color
- Specialty finishes: exposed aggregate, stamped concrete

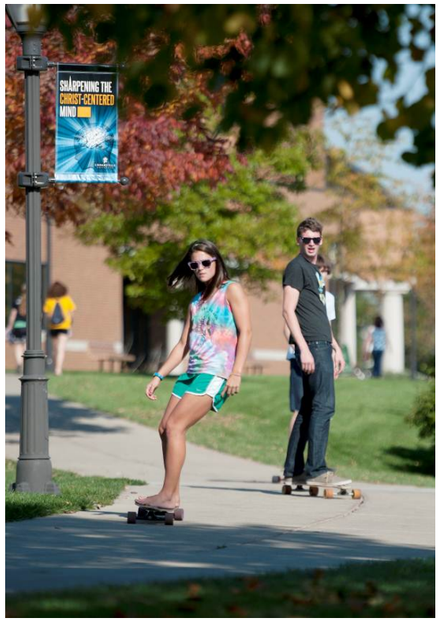
Substitutes Allowed:

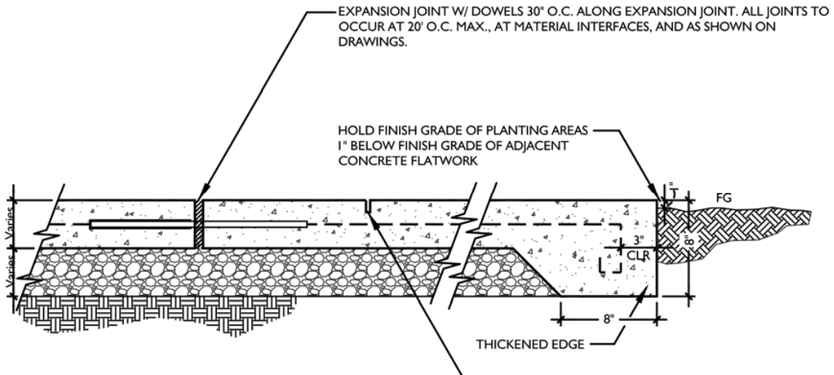
Approved manufacturer or approved equal

Associated Design Standards and Construction Specifications

1. American Society of Testing and Materials, (ASTM).
2. American Concrete Institute, (ACI).
3. California Building Code (CBC)
4. State Standard Specifications, California Department of Transportation.
5. American National Standards Institute, (ANSI).
6. Bay Area Air Quality Management District, Sandblasting Guidelines.







PEDESTRIAN CONCRETE PAVING

SCALE: 1" = 1'-0"

DESIGN STANDARD for Pavers

Purpose:

The purpose of this document is to standardize the use of pavers in pedestrian areas. This design standard ensures the quality of maintenance, reliability, and safety of pavers on campus.

Design Standard:

- Pavers to be used in specialty spaces for a decorative element

Approved Manufacturers:

- Pavers

  Manufacturer: Basalite, basalite.com

  Phone: (707) 678-1901

  Model: Cityscape Series

  Davis Color Options: Dune, Pebble, Taupe and Pewter

- Permeable Paver

  Manufacturer: Basalite, basalite.com

  Phone: (707) 678-1901

  Model: SF Rima Series

  Davis Color Options: Dune, Pebble, Taupe and Pewter

- Edge Restraint – provide edge restraints installed around the perimeter of all interlocking concrete paving unit areas

  Manufacturer: Snap Edge Corporation supplied by Genest Concrete Works, Inc.

  Phone: (800) 932-3343

  Model: Snap Edge

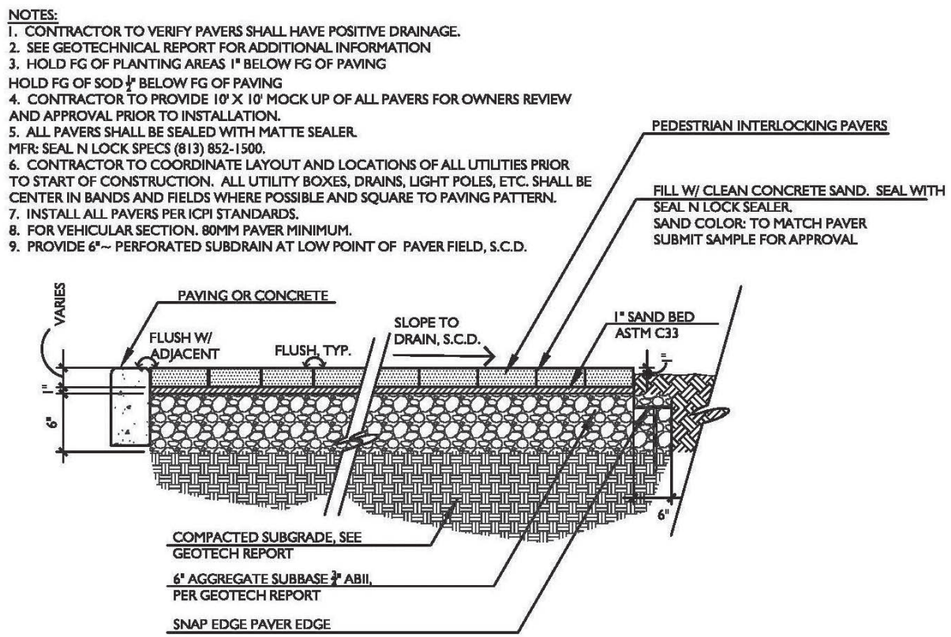
Substitutes Allowed:

Approved manufacturer or approved equal

Associated Design Standards and Construction Specifications

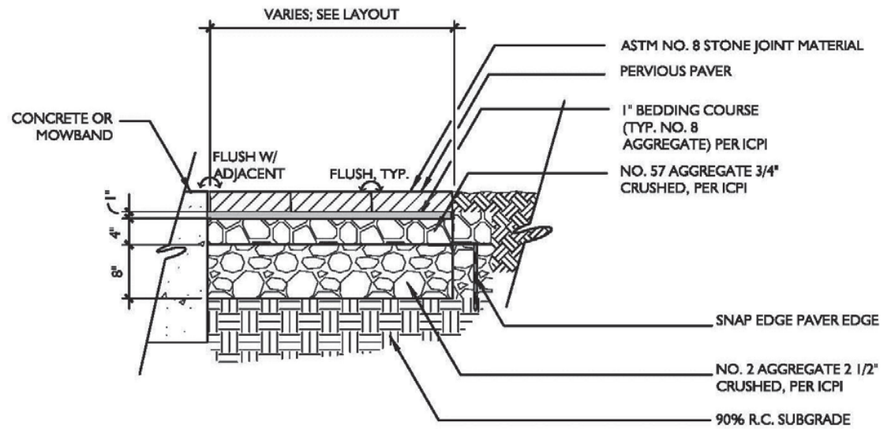
a. American Society for Testing and Materials (ASTM):
   1) ASTM C 33, Standard Specification for Concrete Aggregates.
   2) C 67, Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile, Section 8, Freezing and Thawing.
   3) ASTM C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
   4) ASTM C 140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
   5) ASTM C 144, Standard Specification for Aggregate for Masonry Mortar.
   6) ASTM C 936, Standard Specification for Solid Concrete Interlocking Paving Units.
   7) ASTM C 979, Standard Specification for Pigments for Integrally Colored Concrete.
   8) ASTM D 698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,000 ft-lbf/ft^3 (600 kN-m/m^3)).
   9) ASTM D 1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3)).
   10) ASTM D 2940, Specification for Graded Aggregate Material for Bases or Subbases for Highways or Airports.

b. Interlocking Concrete Pavement Institute (ICPI):
   1) ICPI Tech Spec Technical Bulletins
   Install per manufacturers specifications.



PEDESTRIAN INTERLOCKING PAVERS
SCALE: 3/4" = 1'-0"

NOTES:
1. CONTRACTOR TO VERIFY PAVERS SHALL HAVE POSITIVE DRAINAGE.
2. SEE GEOTECHNICAL REPORT FOR ADDITIONAL INFORMATION
3. HOLD FG OF PLANTING AREAS 1" BELOW FG OF PAVING
HOLD FG OF SOD ½" BELOW FG OF PAVING
4. CONTRACTOR TO PROVIDE 10' X 10' MOCK UP OF ALL PAVERS FOR OWNERS REVIEW AND APPROVAL PRIOR TO INSTALLATION.
5. CONTRACTOR TO COORDINATE LAYOUT AND LOCATIONS OF ALL UTILITIES PRIOR TO START OF CONSTRUCTION. ALL UTILITY BOXES, DRAINS, LIGHT POLES, ETC. SHALL BE CENTER IN BANDS AND FIELDS WHERE POSSIBLE AND SQUARE TO PAVING PATTERN.
6. INSTALL ALL PAVERS PER ICPI STANDARDS.
7. FOR VEHICULAR SECTION. 80MM PAVER MINIMUM.



PERMEABLE PAVERS
SCALE: 3/4" = 1'-0"

DESIGN STANDARD for Planting

Purpose:

The purpose of this document is to standardize the plant materials used throughout the District. This design standard achieves the purpose of ensuring the quality of maintenance, reliability, and aesthetic value of the landscape on the District's campuses

Design Standard:

- In general, use groundcovers, shrubs, and succulents with mature heights less than 3'. For safety and security, landscape plants should not present an opportunity to conceal people.
- Landscape design for location of trees and bushes to be coordinated with site lighting and security camera locations to maximize visibility of pathways and people to enhance safety and security
- No plant material shall be planted until the Landscape Architect has approved its quality and placement.
- Plant trees 5’-0” minimum from paving edges
- Install headerboards between lawn and shrub or groundcover areas and non-landscaped areas
- Mulch all groundcover areas and shrub beds with a layer of recycled bark, 3” deep. Mulch shall be between 1/2” and 1” diameter and between 1” and 2” long. Maintain 3" clearance from root crowns. Do not use weed fabric under bark mulch.
- Secure all vines to walls, or trellis, or supports with approved fasteners, allowing for two years growth.
- All slopes greater than 2.5:1 shall be covered with biodegradable jute netting per manufacturer's specifications. Overlap all edges a minimum of 2" and secure as required with metal staples.
- Plat size needs to be considered when choosing location. Allow enough space for plant size at maturity. This will minimize excessive pruning and maintenance issues.
- Maturity sizing: trees typically will reach mature size in 10-20+ years; shrubs at 5-7 years; perennials at 2-3 years. Annuals should never be planted because their life span is generally six months or less.
- Exposure needs should be adhered to when selecting location/placement. Plants with shade/part-shade should not be planted in full sun and full/part-sun plants should not be planted in shade areas. Keep in mind south/west exposures are full/part-sun; north/east exposures are shade/part-shade.
- Group plants by exposure needs and water needs (hydro-zoning). Place taller plants in background and shorter plants in foreground. When planting under trees, consider access for future tree maintenance.
- Turf at Fairfield campus (except athletic fields) and Vallejo Center properties: 90% dwarf fescue, 10% Kentucky bluegrass.
- Turf at Vacaville Center properties: Tifway 419 hybrid Bermuda grass.
- Turf at athletic fields: Mix of 29.74% sideways perennial rye, 29.34% SR4650 perennial rye grass, 19.88% SR 2100 Kentucky bluegrass, 19.77% Charismatic II perennial rye grass, 0% other crop seed, 0% other weeds, 1.27% inert matter; OR Tifway 419 hybrid Bermuda grass.

Landscape Maintenance Guidelines:

- Trees and shrubs: annual pruning to direct growth and repair damage.
  - Prune deciduous types during winter dormancy.
  - Prune evergreen types spring through early fall.
  - Under no circumstances will stripping of lower branches ("raising up") of young trees be permitted. Lower branches shall be retained in a "tipped back" or pinched condition with as much foliage as possible to promote caliper trunk growth (tapered trunk).
  - All pruning shall be made flush to lateral branches, buds, or trunk. "Topping" will not be permitted.
- Perennials: prune after bloom cycles.
- Grasses: prune during winter dormancy.
  - Grasses and grass-like plants should be maintained by thinning foliage and NOT pruned like a shrub. When the leaves of these plants are sheared, they die back and never recover.

TREE PALETTE

LEGEND

SUN/SHADE REQUIREMENTS

- FULL SUN
- PARTIAL SUN
- SHADE
- CALIFORNIA NATIVE

WATER REQUIREMENTS

- VERY LOW
- LOW
- MODERATE
- REGULAR

Spine & Bosque Trees

Acer Rubrum 'New World'
New World Red Maple
Location: Secondary Spines
Height: 30'
Spread: 15'
Deciduous

Carpinus betulus 'Frans Fontaine'
Columnar Hornbeam
Location: Primary Spines
Height: 35'
Spread: 15'
Deciduous

Prunus serrulata 'Amanogawa'
Amanogawa Japanese Flowering Cherry
Height: 25'
Spread: 4' to 8'
Deciduous

Prunus x yedoensis
Akebono Cherry
Height: 25'
Spread: 25'
Deciduous

Quecus rubra 'Fastigiata'
Columnar English Oak
Height: 50'
Spread: 15'
Deciduous

Zelkova serrata 'Musashino'
Zelkova
Location: Tertiary Spines
Height: 40'
Spread: 15'
Deciduous

Canopy/Shade Trees

Celtis sinensis
Chinese Hackberry
Height: 35'
Spread: 35'
Deciduous

Ulmus parvifolia
Chinese Elm
Height: 50'
Spread: 60'
Deciduous

Parking Lot/Shade Trees

Pistacia chinensis
Chinese Pistache
Height: 30’ to 60’
Spread: 30’ to 60’
Deciduous

Platanus x hispanica ‘Columbia’
London Plane Tree
Height: 50’
Spread: 30’
Deciduous

Quercus Virginiana
Southern Live Oak
Height: 40’ to 60’
Spread: 40’ to 60’
Evergreen

Parking Lot/Shade Trees

Chitalpa tashkenensis
Chitalpa
Height: 25’
Spread: 20’ to 30’
Deciduous

Lagerstroemia indica
Crape Myrtle
Height: 25’
Spread: 25’
Deciduous

Orchard Trees

Malus spp.
Crabapple
Height: 25’
Spread: 25’
Deciduous

Screen Trees

Elaeocarpus decipiens
Japanese Blueberry
Height: 50’
Spread: 25’
Evergreen

Laurus nobilis ‘Saratoga’
Sweet Bay
Height: 30’
Spread: 30’
Evergreen

Podocarpus gracilior ‘Icee Blue’
Blue Ice Yellow-Wood
Height: 20’
Spread: 20’
Evergreen

Trees

Acacia baileyana
Bailey Acacia
Height: 20’ to 30’
Spread: 20’ to 40’
Evergreen

Arbutus ‘Marina’
Marina Madrone
Height: 25’ to 30’
Spread: 20’ to 25’
Evergreen

Cotinues coggygria ‘Royal Purple’
Royal Purple Smoke Bush
Height: 10’ to 15’
Spread: 10’ to 15’
Deciduous

Feijoa sellowiana
Pineapple Guava
Height: 15’ to 20’
Spread: 15’ to 20’
Evergreen

Fraxinus angustifolia ‘Raywood’
Raywood Ash
Height: 40’ to 50’
Spread: 25’ to 35’
Deciduous

Geijera parvifolia
Australian Willow
Height: 25’ to 30’
Spread: 20’ to 25’
Evergreen

Ginkgo biloba ‘Autumn Gold’
Autumn Gold Maidenhair Tree
Height: 40’ to 45’
Spread: 30’ to 35’
Deciduous

Rhus lancea
African Sumac
Height: 20’ to 30’
Spread: 20’ to 30’
Evergreen

Vitex agnus-castus
Chaste Tree
Height: 10’ to 15’
Spread: 10’ to 15’
Deciduous

PLANTING PALETTE

See legend above for sun/shade & water requirements

Groundcovers & Vines

Acacia redolens
Prostrate Wattle
Height: 3’ to 6’
Spread: 6’ to 12’
Evergreen

Arctostaphylos uva-ursi
Kinnikinnick Manzanita
Height: 6” to 1’
Spread: 6” to 1’
Evergreen

Bergenia crassifolia
Winter Blooming Bergenia
Height: 1’
Spread: 2’
Evergreen

Carex pansa
Dune Sedge
Height: 10”
Spread: 1’
Evergreen

Ceanothus griseus horizontalis ‘Yankee Point’
Ceanothus
Height: 2’ to 3’
Spread: 8’ to 10’
Evergreen

Cistus salviifolius ‘Prostratus’
Sageleaf Rockrose
Height: 2’ to 3’
Spread: 5’ to 6’
Evergreen

Cotoneaster dammeri ‘Lowfast’
Lowfast Bearberry
Height: 1’ to 2’
Spread: 6’ to 8’
Deciduous

Erigeron karvinskianus
Santa Barbara Daisy
Height: 18’
Spread: 2’
Evergreen

Ficus pumila
Creeping Fig
Fast Grower
Evergreen

Gazania hybrids
Gazania
Height: 6” to 1’
Spread: 2’ to 4’
Evergreen

Geranium ‘Rozanne’
Rozane Cranesbill
Height: 1’ to 2’
Spread: 2’ to 3’
Evergreen

Hypericum calycinum
St. John’s Wart
Height: 1’
Spread: 2’ to 4’
Evergreen

Lantana montevidensis
Lantana
Height: 2’ to 3’
Spread: 2’ to 4’
Semi-Evergreen

Leymus condensatus ‘Canyon Prince’
Giant Wild Rye
Height: 2’
Spread: 2’
Evergreen

Penstemon heterophyllus
Foothill Penstemon
Height: 1’ to 2’
Spread: 2’ to 3’
Semi-Evergreen

Rosa x Noatraum
Flower Carpet Pink Groundcover Rose
Height: 2’
Spread: 3’
Deciduous

Rosmarinus offi cinalis ‘Prostratus’
Rosemary
Height: 2’
Spread: 3’ to 4’
Evergreen

Salivia ‘Bee’s Bliss’
Bee’s Bliss Sage
Height:1’ to 2’
Spread: 4’ to 6’
Evergreen

Salvia sonomensis
Sonoma Sage
Height: 1’
Spread: 3’ to 4’
Evergreen

Teucrium x lucidrys
Prostrate Germander
Height: 1’
Spread: 2’
Evergreen

Trachelospermum jasminoides
Star Jasmine
Height: 2’
Spread: 4’
Evergreen

Veronica prostrata
Prostrate Speedwill
Height: 1’
Spread: 2’
Evergreen

Succulents

Agave Attenuata
Fox Tail Agave
Height: 2’ to 3’
Spread: 4’ to 6’
Evergreen

Aloe Arborescens
Torch Aloe
Height: 3’ to 4’
Spread: 3’ to 4’
Evergreen

Aloe ‘Johnson Hybrid’
Johnson’s Aloe
Height: 1’ to 2’
Spread: 1’ to 2’
Evergreen

Aloe saponaria
Soap Aloe
Height: 12” to 18”
Spread: 2’ to 3’
Evergreen

Echeveria secunda
Hens & Chicks
Height: 6” to 9”
Spread: 1’ to 2’
Evergreen

Sedum ‘Autumn Joy’
Autumn Joy Stone Crop
Height: 1’ to 2’
Spread: 2’ to 3’
Deciduous

Sempervivum tectorum
Houseleek
Height: 6” to 12”
Spread: 1’ to 2’
Evergreen

Senecio mandraliscae
Chalksticks
Height: 12” to 18”
Spread: 2’ to 3’
Evergreen

Yucca pallidar
Soapweed Yucca
Height: 1’ to 2’
Spread: 3’ to 4’
Evergreen

Low Shrubs

Achillea millefolium ‘Island Pink’
Island Pink Yarrow
Height: 1’
Spread: 2’
Semi-Evergreen

Bergenia cordifolia
Bergenia
Height: 1’ to 2’
Spread: 1.5’ to 2.5’
Evergreen

Carex divulsa
Sedge
Height: 1’ to 1.5’
Spread: 1’ to 2.5’
Evergreen

Coleonema pulchrum ‘Sunset Gold’
Breath of Heaven
Height: 1.5’ to 2.5’
Spread: 2.5’ to 4’
Evergreen

Coprosma kirkii ‘Variegata’
Coprosma
Height: 1’ to 3’
Spread: 5’
Evergreen

Euonymus fortunei ‘Emerald n Gold’
Emerald n Gold Winter Creeper
Height: 2’
Spread: 4’ to 5’
Evergreen

Euonymus fortunei ‘Ivory Jade’
Ivory Jade Winter Creeper
Height: 2’
Spread: 4’ to 5’
Evergreen

Festuca glauca
Blue Fescue
Height: 6” to 1’
Spread: 10” to 1’
Evergreen

Helictotrichon sempervirens
Blue Oat Grass
Height: 2’ to 3’
Spread: 2’ to 3’
Evergreen

Helleborus argutifolius
Corsican Hellebore
Height: 2’ to 3’
Spread: 2’ to 3’
Evergreen

Heuchera maxima
Island Alum Root
Height: 1’ to 2’
Spread: 2’ to 3’
Evergreen

Leptospermum scoparium ‘Pink Cascade’
Pink Cascade Manuka
Height: 1’
Spread: 3’ to 4’
Evergreen

Liriope muscari
Lilyturf
Height: 6” to 1’
Spread: 1’ to 1.5’
Evergreen

Santolina chamaecyparissus cvs.
Lavendar Cotton
Height: 1’ to 2’
Spread: 2’ to 3’
Evergreen

Sarcococca hookeriana humilis
Sweet Box
Height: 1’ to 2’
Spread: 5’ to 6’
Evergreen

Tulbaghia violacea ‘Silver lace’
Society Garlic
Height: 18”
Spread: 2’
Evergreen

Calamagrostis acutiflora ‘Karl Foerster’
Karl Foerster
Height: 2’ to 3’
Spread: 2’ to 3’
Evergreen

Callistemon viminalis ‘Little John’
Bottlebrush
Height: 2.5’ to 3’
Spread: 3’ to 3.5’
Evergreen

Cistis x pulverulentus ‘Sunset’
Sunset Rockrose
Height: 2’ to 3’
Spread: 5’ to 7’
Evergreen

Euonymus fortunei ‘Canadale Gold’ also ‘Ivory Jade’ & ‘Emerald Gaiety’”
Canadale Gold Wintercreeper
Height: 3’ to 4’
Spread: 3’ to 3.5’
Evergreen

Euphorbia amygdaloides ‘Purpurea’
Purpurea Sage
Height: 2’ to 3’
Spread: 2’
Evergreen

Euphorbia x martini
Martin Spurge
Height: 2’ to 3’
Spread: 2’ to 3’
Evergreen

Intermediate Shrubs

Abelia grandiflora ‘Kaleidoscope’ also ‘Confetti’ & ‘Mardi Gras’
Kaleidoscope Abelia
Height: 2’ to 3’
Spread: 3’ to 4’
Evergreen

Berberis thunbergii atropurpurea ‘Crimson Pygmy’ & ‘Golden Ring’
Barberry
Height: 2’ to 3’
Spread: 3’
Deciduous

Cistis x skanbergii
Skanbergii Rockrose
Height: 3’
Spread: 6’ to 8’
Evergreen

Correa pulchella ‘Mission Bells’
Mission Bells Australian Fuchsia
Height: 2’ to 3’
Spread: 4’ to 6’
Evergreen

Hemerocallis hybrids (evergreen)
Daylily
Height: 2’ to 3’
Spread: 2’ to 3’
Evergreen

Hesperaloe parvifolia
Red Yucca
Height: 2’ to 3’
Spread: 3’ to 4’
Evergreen

Juncus Patens
California Gray Rush
Height: 1’ to 2’
Spread: 1’ to 2’
Evergreen

Lomandra longifolia
Mat Rush
Height: 2’ to 4’
Spread: 2’ to 4’
Evergreen

Mahonia Aquifolium Compacta
Compacta Oregon Grape
Height: 2’ to 3’
Spread: 3’ to 4’
Evergreen

Miscanthus sinensis
Japanese Silver Grass
Height: 4’ to 6’
Spread: 4’ to 6’
Deciduous

Pennisetum setaceum ‘Rubrum’
Purple Fountain Grass
Height: 3’
Spread: 3’

Phlomis russeliana
Jerusalem Sage
Height: 2’ to 3’
Spread: 3’ to 4’
Evergreen

Phormium ‘Jack Spratt ’
New Zealand Flax
Height: 1’ to 2’
Spread: 1’ to 2’
Evergreen

Phormium ‘Wings of Gold’
New Zealand Flax
Height: 3’ to 4’
Spread: 2’ to 3’
Evergreen

Phormium hybrid ‘Maori Maiden’
New Zealand Flax
Height: 2’ to 3’
Spread: 3’ to 4’
Evergreen

Pittosporum tobira ‘Wheelers Dwarf’
Mock Orange
Height: 2’ to 3’
Spread: 2’ to 3’
Evergreen

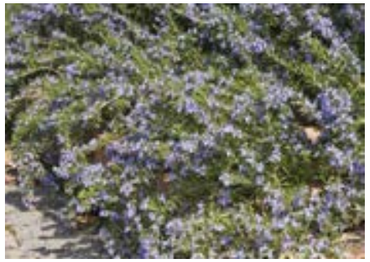
Punica granatum ‘Nana’
Dwarf Flowering Pomegranate
Height: 2’ to 3’
Spread: 3’ to 5’
Deciduous

Rhamnus californica ‘Seaview’
Dwarf Coffeeberry
Height: 2’
Spread: 6’
Evergreen

Rhaphiolepis indica ‘Ballerina’ also ‘Indian Princess’
Indian Hawthorn
Height: 2’
Spread: 4’
Evergreen

Rosa knockout ‘Pink’
Pink Knockout Rose
Height: 3’ to 4’
Spread: 3’ to 4’
Deciduous

Rosa meidiland cvs
Meidiland Rose
Height: 2’ to 4’
Spread: 3’ to 5.5’
Deciduous



Rosemary officinilis 'Irene' also 'Collingwood Ingram', 'Huntington Carpet' & 'Majorica Pink'"
Trailing Blue Rosemary
Height: 2' to 3'
Spread: 6' to 8'
Evergreen

Salvia clevelandii 'Winnifred Gilman'
Winnifred Gilman Cleveland Sage
Height: 3'
Spread: 3'
Evergreen

Salvia greggii 'Furman's Red'
Red Autumn Sage
Height: 2' to 3'
Spread: 2' to 3'
Semi-Evergreen

Salvia gregii 'Wild Thing'
Pink Autumn Sage
Height: 2' to 3'
Spread: 2' to 3'
Semi-Evergreen

Salvia gregii
Autumn Sage
Height: 2' to 3'
Spread: 2' to 3'
Evergreen

Vivurnum davidii
Indian Hawthorn
Height: 2' to 3'
Spread: 3' to 4'
Evergreen

Background & Screen Shrubs

Ceanothus 'Joyce Coulter'
Ceanothus
Height: 2' to 5'
Spread: 10' to 12'
Evergreen

Dodonaea viscosa 'Purpurea'
Hopseed Bush
Height: 8' to 12'
Spread: 6' to 10'
Evergreen

Escallonia exoniensis 'Fradesii'
Pink Princess Escallonia
Height: 6' to 12'
Spread: 6' to 12'
Evergreen

Loropetalum chineses cvs
Chinese Fringe Flower
Height: 4' to 6'
Spread: 4' to 6'
Evergreen

Myrtus communis 'Compact Variegata'
Myrtle
Height: 4' to 6'
Spread: 4' to 6'
Evergreen

Phormium hybrids 'Yellow Wave' also 'Apricot Queen', 'Bronze Baby', 'Dazzler', 'Duet', 'Jack Spratt', 'Jester', 'Maori Queen', 'Maori Sunrise' & 'Tom Thumb'"
New Zealand Flax
Height: 4' to 6'
Spread: 4' to 6'
Evergreen

Rhapiolepis x 'Montic'
Indian Hawthorn
Height: 20' to 25'
Spread: 8' to 10'
Evergreen

Rhus integrifolia
Lemonade Bush
Height: 3' to 10'
Spread: 3' to 10'
Evergreen

Westringia fruc?? cosa 'Morning Light' cvs
Coast Rosemary
Height: 3' to 4'
Spread: 3' to 4'
Evergreen

DESIGN STANDARD for Tables and Chairs

Purpose:

The purpose of this document is to standardize the tables and chairs used for group seating. This design standard ensures the quality of maintenance, reliability, and safety of tables and chairs on campus.

Design Standard:

- Must allow clearance for pedestrian movement around tables and chairs
- Should be placed in a variety of settings, with some shade
- Must be ADA compliant

Approved Manufacturers:

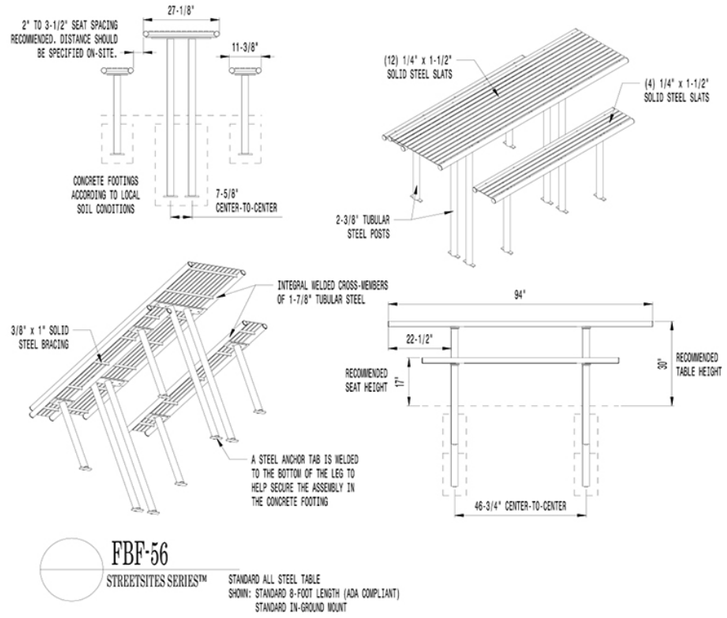
- Victor Stanley; FBF-56 Streetsites Series, 8’ Steel Table and (2) 6’ Benches
    - Color: Powder coat grey
    - Mount: In-Ground
- Victor Stanley; A-I-424 Anthrosites Series, all metal
    - Color: Powder coat grey

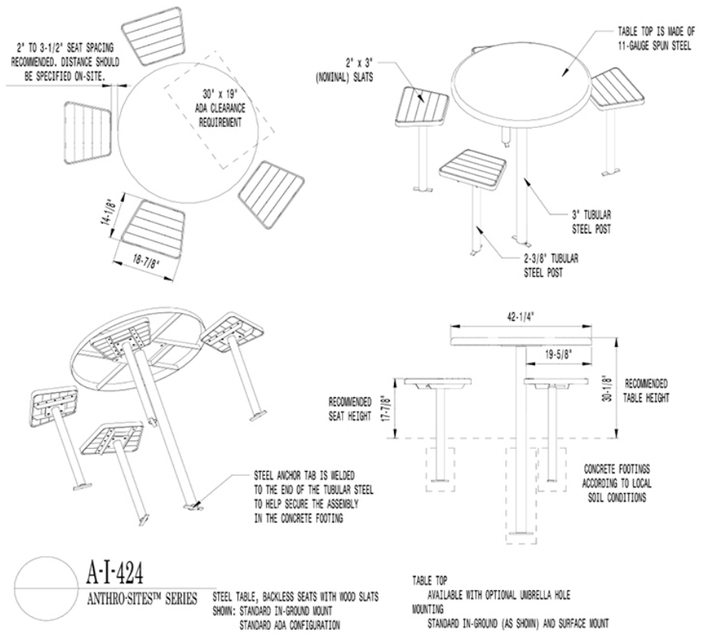
Substitutes Allowed:

Approved manufacturer or approved equal

Associated Design Standards and Construction Specifications

Install per manufacturer’s specifications.





DESIGN STANDARD for Trash and Recycling Receptacles

Purpose:

The purpose of this document is to standardize the trash, waste, and recycling receptacles used throughout all the campuses.

Design Standard:

- Trash and recycling should be placed together
- Place at main entrances to buildings, plazas, and pedestrian walkways
- Place with other site furniture for functional and organized gathering areas

Approved Manufacturers:

- Landscape Forms: Scarborough Litter Receptacle with 30-gallon side opening, Vertical strap, with Lock
    - Finish: Pangard II® polyester
    - Color: powder coat Stormcloud for trash receptacles; powder coat Bluebell for recycling receptacles
- Landscape Forms: Scarborough Receptacle with 30-gallon side opening, Vertical strap, dual use
    - Finish: Pangard II® polyester
    - Color: powder coat Stormcloud for trash receptacles; powder coat Bluebell for recycling receptacles

Substitutes Allowed:

Approved manufacturer or approved equal.

Associated Design Standards and Construction Specifications

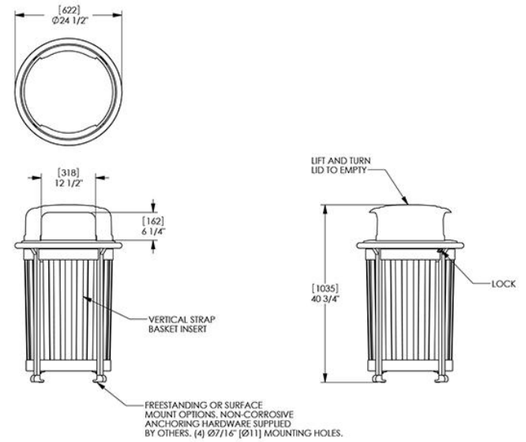
Install per manufacturer’s specifications

Scarborough™

Litter Receptacle, Side Opening, 30 Gallon, Vertical Strap, with Lock

landscapeforms®

www.landscapeforms.com Ph: 800.521.2546

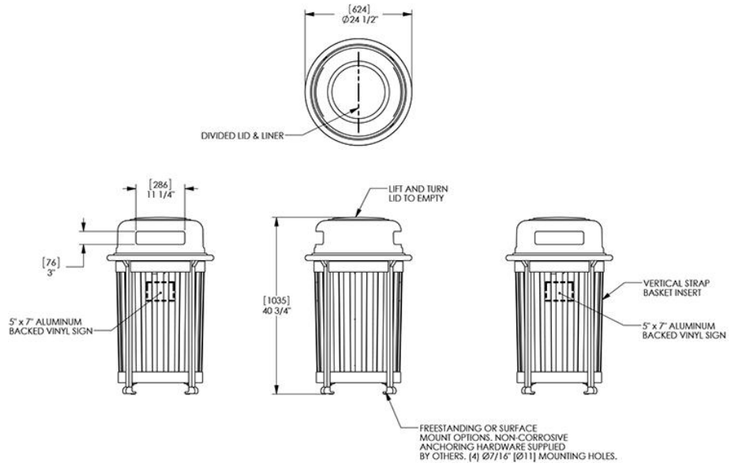


Scarborough™ Receptacle, 30 Gallon, Side Opening, Vertical Strap, Dual Use, Two Slot Openings

Product Drawing

Date: 12/11/2013

www.landscapeforms.com Ph: 800.521.2546



DESIGN STANDARD for Tree Grates

Purpose:

The purpose of this document is to standardize the tree grates used throughout the campus. This design standard achieves the purpose of ensuring the quality of maintenance, reliability, and aesthetic value of these objects on campus.

Design Standard:

- Can be used in high traffic areas or where space is limited

Approved Manufacturers:

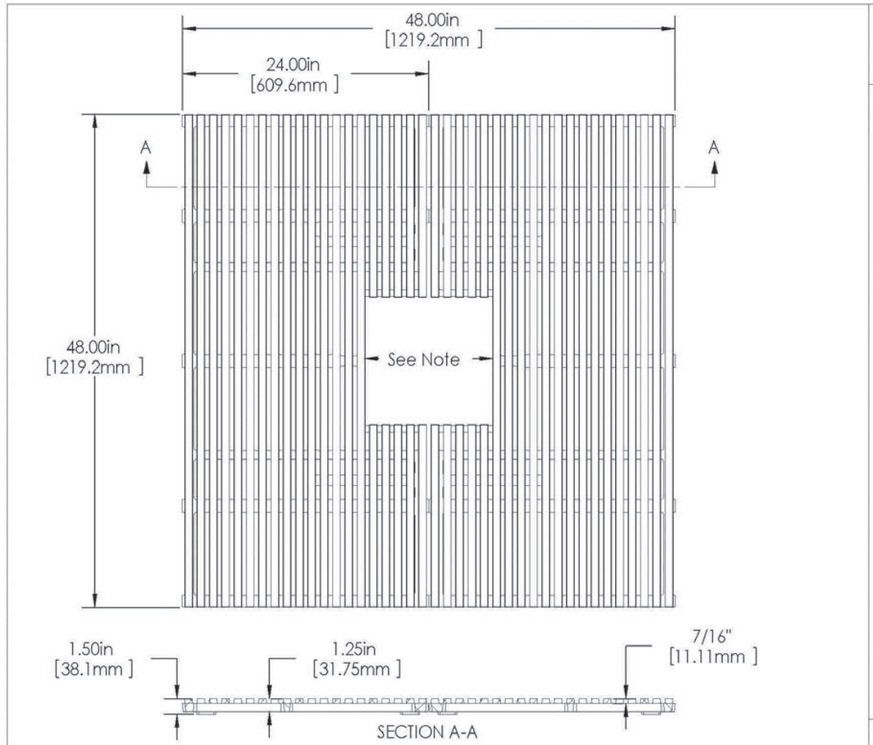
- IronSmith. Metro Tree Grate, ½" slots, with anti-theft hardware
    - Material: Cast aluminum
    - Finish: Brushed

Substitutes Allowed:

Ironsmith Metro Tree Grate or approved equal

Associated Design Standards and Construction Specifications

Install per manufacturer specifications



Architectural Standards

DESIGN STANDARD for Acoustical Panel Ceilings

Purpose:

The purpose of this design standard is to achieve the following performance and sustainability criteria for acoustical ceiling panels installed at the Solano Community College District sites:

- High noise reduction and CAC coefficients
- Good light reflectance to conserve energy associated with mechanical lighting
- Product using recycled content
- High humidity resistance to prevent sagging

Note: these Design Standards are a tool to clarify direction and streamline project execution for design professionals, construction managers and other participants in capital improvement projects. They represent the District's "strong preference" and should be applied, when possible, without compromising the creativity of the overall design. Final disposition, color, size, product choice etc. should conform to the best extent possible where equivalent substitutes are allowed in the Design Standard. If equivalent substitutes are allowed only "if performance and quality equivalency can be evidenced" or the consultant wishes to deviate from the written design standards for other reasons, then the consultant needs to provide evidence/justification and seek District approval as outlined in the ***Open this Document First: Standards Process.pdf***. In all cases the written design standards do not diminish or eliminate the standard of care owed by the consultant to SCCD or relieve, in any manner whatsoever, a consultant from any professional responsibility, duty or due diligence required toward that work.

Design Standard:

- Solano College's preference is to simplify design, construction and maintenance by limiting panels to one type (and standard sizes) in any given project, unless programmatic requirements call for specialized/unusual sized panels in certain areas.
- Specialized/unusual size panels have to be reviewed and approved by the Director of Facilities. Larger size panels are harder to remove and replace so factors contributing to approval are the location of panels with respect to items above ceilings that need to be maintained/serviced.
- Design Professionals should specify that contractor is to provide 10% attic stock for all panel types used on this project.
    - This attic stock will be stored in the Custodial Main Storage Room within the same building (see **Design Standard for Custodial Spaces**). Doing so avoids confusion with which panels belong to which buildings and reduces maintenance time associated with locating extra stock and replacing panels.

- For Standard Typical Applications:
    1. Lowest Grade of Acoustic Ceiling Panel: use only when acoustic criteria, light reflectance, recycled content and humidity resistance are not of high priority and the space is temporary or of utility use only.
        - Size: 2' x 4' x 5/8" Flat Panel
        - Color: White
        - Style: Square Lay-in
        - NRC Rating: 0.55
        - CAC Rating: 0.35
        - LR Rating: 0.80
        - Recycled Content: not less than 40%
        - Cost Rating: $
        - Product: USG Radar #2315 or equivalent in performance criteria above.
    2. Highest Grade of Acoustic Ceiling Panel: for normal occupied classroom, corridor and office spaces. This panel has the "second look" in that it is a 2' x 4' panel with a tegular 2' x 2' appearance, which adds textural richness to the ceiling plane while still using the economical and easily accessible larger grid spacing.
        - Size: 2' x 4' x 5/8" Flat Panel
        - Color: White
        - Style: Angled Tegular
        - NRC Rating: 0.70
        - CAC Rating: 0.35 or higher
        - LR Rating: 0.85
        - Recycled Content: no less than 40%
        - Cost Rating: $$
        - Product: USG Millennia Clima Plus, Illusion Two/24 Panels, SLT Edge detail, Panel #78780, or equivalent as long as "second look" aesthetic and performance criteria as noted above are met.
    3. Special Grade of Acoustic Ceiling Panel: for applications such as computer and control rooms, kitchens/food prep areas (specify Class 100 panels) and laboratories that may require this level of cleanability.
        - Size: 2' x 4' x 3/4" Flat Panel
        - Class: 10M-100M Panels typical, Class 100 panels for Kitchen/Prep Areas.
        - Color: White
        - Style: Square
        - NRC Rating: 0.55
        - CAC Rating: 0.35
        - LR Rating: 0.79
        - Recycled Content: no less than 40%
        - Cost Rating: $$$
        - Product: USG Clean Room ClimaPlus, 10M-100M Panels, Panel # 56090 or equivalent as long as performance criteria as noted above are met.
- Suspended Grid System: USG Donn/DX series, white.

Approved Manufacturers:

As noted in this Standard.

Substitutes Allowed:

As noted in this Standard.

Associated Design Standards and Construction Specifications

Design Standard for Custodial Spaces.

End of Document

DESIGN STANDARD for Casework

Purpose:

The purpose of this design standard is to create a consistent standard for the quality, reliability and ease of maintenance for casework throughout the Solano Community College District. Casework must be designed and installed with the understanding that it will be subject to decades of use, abuse and continually changing applications. Casework should be simple and intuitive to use. Surface materials should hide dirt and wear, while being aesthetically pleasing.

Note: these Design Standards are a tool to clarify direction and streamline project execution for design professionals, construction managers and other participants in capital improvement projects. They represent the District's "strong preference" and should be applied, when possible, without compromising the creativity of the overall design. Final disposition, color, size, product choice etc. should conform to the best extent possible where equivalent substitutes are allowed in the Design Standard. If equivalent substitutes are allowed only "if performance and quality equivalency can be evidenced" or the consultant wishes to deviate from the written design standards for other reasons, then the consultant needs to provide evidence/justification and seek District approval as outlined in the ***Open this Document First: Standards Process.pdf***. In all cases the written design standards do not diminish or eliminate the standard of care owed by the consultant to SCCD or relieve, in any manner whatsoever, a consultant from any professional responsibility, duty or due diligence required toward that work.

Design Standard:

1. **Countertops**
   - Science or Vocational laboratory countertops shall be cast of epoxy resin for the following reasons:
     - Solid materials, such as epoxy resin, do not delaminate, nor do they contain off-gassing glues/binders; therefore, the quality of indoor air is healthier.
     - Epoxy resin does not depend on a surface coating for chemical resistance.
     - Molded construction allows for integral back-splashes and marine edges.
     - A non-glare matte finish is attractive and easy to maintain.
     - Plastic Laminates are not permitted for Science or Vocational Laboratory countertops.
   - SCCD's preference for other countertops is natural stone such as slab granite, recycled glass material Terrazo, composite engineered stone, or a solid material such as epoxy resin for the following reasons:
     - These materials does not contain off-gassing glues/binders; therefore they contribute to healthier indoor air quality, and they do not have the de-lamination issues associated with plastic laminates.

- For non-wet conditions alternate materials will be considered. Design professionals are encouraged to consider sustainable products such as wood and bamboo, 9-ply plywood and other similar sustainably produced products that do not contain off-gassing glues/binders. Plastic laminates are discouraged due to the de-lamination issues, but may be permitted on a case by case basis.
- For countertops with sinks: locate sink faucets so that outlet is well over sink to prevent water splashing onto counter top.
    - Sinks shall be fabricated of a material equal to or better than counter top material. Verify required size and depth of sinks with User.

- All edges shall have fused edging, such as 3MM PVC, and backer sheet. Self-edges, T-mold or bull-nosed laminate edges are unacceptable.

2. Casework:

- Casework shall be WIC Certified.
- The use of the WIC Manual of Millwork as a standard of performance is acceptable provided the specific grades which are applicable are specified.
    - Minimum quality for casework shall be WIC Custom Grade.
    - Science and vocational laboratory casework shall be WIC Laboratory quality.
- Include in construction specifications the requirement for contractor to arrange for and pay costs of WIC inspections, and obtain WIC Certified Compliance Label on each unit of casework indicating grade specified. In order to allow non-WIC licensed millwork contractors to bid on SCCD projects, include the following provision in construction specifications:

> "Millwork specified shall be manufactured in accordance with the standards established in the Manual of Millwork of the Woodwork Institute of California, current edition, in the grade or grades hereinafter specified or as shown on the drawings. If the manufacturer of millwork is not a WIC licensee, Contractor shall furnish to Architect, prior to installation, a Certificate of Re-inspection by the WIC indicating that the millwork in question meets the requirements of the WIC grade specified. If the manufacturer of millwork is a WIC licensee, each unit of millwork shall bear the WIC Certified Compliance grade stamp indicating the grade specified, and by the completion of the job WIC Certified Compliance Certificates shall be provided indicating the grade specified. The foregoing shall not be construed to limit the power and authority of Architect to reject millwork which does not, in Architect's opinion, meet with any one or more of the specifications of the contract."

- Casework Design Guidelines
    - Casework is to be of modular design (4'- 0" lengths) for ease of access to building site and possible reuse in future remodeling work.
    - Design drawers and shelves for heavy loading; use metal standards/rests and/or guides only with a minimum load carrying capacity of 125 pounds.
    - Specify adequate backing in stud walls for attachment of casework, and detail same on Drawings.
    - Verify if User requires locks for casework doors and/or drawers. If locks are required, verify keying requirements with User. Comply with **Design Standard for Door Hardware**.
    - Verify if User requires glazed or full glass casework doors.
    - Where plastic laminate is used for casework cabinet bodies, verify with User whether chemical resistant type is required. If wood is used for casework bodies, verify with User whether finish must be chemical resistant.
    - Design of shelving span shall be verified with User, since they may load same with heavy equipment, etc.
    - All edges shall have fused edging, such as 3mm PVC, and backer sheet. Self-edges, T-mold or bull-nosed laminate edges are unacceptable.
    - Design minimal design details (nooks, crannies, edges in millwork) which require additional time or labor for cleaning.
    - Specify standard rubber base around exposed bases of casework, to create a unified appearance at the base of walls and casework. Direct contractor to run a bead of silicone caulk where casework base meets floor, prior to installation of rubber base, to ensure that floor cleaning activities do not damage the structural integrity of the casework base. Comply with **Design Standard for Flooring** for rubber base specification.
    - Design sloped wall cabinet tops, to discourage storage of items which is a safety hazard and a cleaning burden.
    - Casework must be adjustable over time to accommodate new contents, changes in teaching styles and technology. Ensure that such flexibility is achievable by non-tradespersons; i.e., design such flexibility into the initial design of the casework.
    - Specify adjustable metal shelf standards and rests.
    - Drawer and door pulls shall be 4" metal wire pull type, in stainless steel or satin nickel.
    - Cabinet locks: comply with requirements stated **Design Standard for Door Hardware**.
    - Drawer Slides: full extension steel slides, white epoxy coated, with steel bearing rollers and integral positive stops, anti-slamming. Static load carrying capacity of minimum 125 pounds.
    - Concealed hinges, Grade 2 European Style, 170 degree opening, all steel construction, self-closing.
    - Catch: magnetic catch with plastic housing.

3. Color/Finishes:

- The casework materials for any given project should be designed in consultation with the furniture consultant or furniture coordinator, since the architectural and furniture finishes will be experienced holistically by the building's end users.

Approved Manufacturers:

The fabricator shall be equipped for and experienced in doing work, including fabricating, finishing, and installing, equal to standards specified, and be able to provide evidence of such experience to the Architect's and District's satisfaction. Failure to meet these qualifications may be sufficient cause for rejection.

Substitutes Allowed:

Not Applicable.

Associated Design Standards and Construction Specifications

Design Standard for Door Hardware
Design Standard for Flooring

End of Document

DESIGN STANDARD for Custodial Spaces

Purpose:

Custodial spaces include **Custodial Closets** and **Facilities Main Storage Rooms**. Adequate sized and placed custodial closets are essential for productive and efficient maintenance of a facility. Too small of a closet and too few closets add unproductive labor hours spent going back and forth to closets or other floors to gather custodial supplies and equipment. Similarly, every building must have adequate custodial storage space to store bulk supplies and equipment. The following guidelines will lower the long-term cost of maintaining a facility with increased productivity and efficiency of the custodial crew.

Note: these Design Standards are a tool to clarify direction and streamline project execution for design professionals, construction managers and other participants in capital improvement projects. They represent the District's "strong preference" and should be applied, when possible, without compromising the creativity of the overall design. Final disposition, color, size, product choice etc. should conform to the best extent possible where equivalent substitutes are allowed in the Design Standard. If equivalent substitutes are allowed only "if performance and quality equivalency can be evidenced" or the consultant wishes to deviate from the written design standards for other reasons, then the consultant needs to provide evidence/justification and seek District approval as outlined in the ***Open this Document First: Standards Process.pdf***. In all cases the written design standards do not diminish or eliminate the standard of care owed by the consultant to SCCD or relieve, in any manner whatsoever, a consultant from any professional responsibility, duty or due diligence required toward that work.

Design Standard:

A. Custodial Closets:

- Closet locations: Placed on every floor with not more than 150 feet between closets. For each 15,000 to 18,000 square feet of building floor space, provide a minimum of one closet. Locate closets adjacent to, or between, restrooms, for economics of plumbing. Alternate preferred location is close to an elevator. **Do not** locate closets in stairway landings or under stairways.
- **Do not** locate electrical panels, elevator controls, telephone equipment, roof hatches and plumbing items inside the closets.
- Closet size: should be 8' x 8' (64 sq. ft.) minimum.
- Shelving: Shelving at eye level with a minimum of two 24" deep shelves. Wooden shelves are more practical than steel because of the corrosion that can occur with chemicals. For gallon size chemicals a minimum of 18 inches between shelving is required.
- Provide adequate ventilation with an exhaust grill in the upper wall or ceiling.

- Electrical: Minimum one GFCI (ground fault circuit interrupter) outlet.
- Lighting: Provide at least 50 to 75 foot candles of illumination or a minimum two fluorescent tube ceiling light with a safety guard to protect breaking of tubes. Install a motion light sensor to conserve energy.

B. Facilities Main Storage Room:

- The Facilities Main Storage Room will store bulk supplies and equipment for building maintenance purposes and it will also store building replacement materials for that particular building (e.g. extra stock for ceiling panels, carpet tiles etc.).
- The Facilities Main Storage Room should not include boilers, water heaters, electrical panels, similar mechanical or electrical equipment, or roof access.
- Facilities Main Storage Room Size: should be 10' x 20' (200 sq. ft.) minimum.
- The Facilities Main Storage does not replace a Custodial Closet for that particular floor/area. The Facilities Main Storage is in addition to the Custodial Closet requirements. Should the layout of the Building require these to be combined for a particular floor/area, the size of the combined room shall be 264 sq. ft. minimum.
- Storage location: Near an elevator and normally placed in the lower levels of the facility.
- Shelving: Reinforced shelving that is wall mounted along one entire wall.
- Provide adequate ventilation with an exhaust grill in the upper wall or ceiling.
- Electrical: Several GFCI outlets to charge battery-operated equipment.
- Lighting: Install two sets of two fluorescent tube-ceiling lights.

C. Doors:

- Comply with **Design Standard for Door Hardware**.
- Door Swing and Space Implications: doors should open outward to gain maximum square footage. Doors to Custodial and Facilities Main Storage Room spaces to swing outward. If this cannot be accomplished, the size of the room shall be increased by ten square feet.
- Door Size:
  - Custodial Closet: Door should be 36 inches minimum.
  - Facilities Main Storage: Door should be 42 inches minimum.
- Provide Hollow Metal door and door frames per **Design Standard for Doors and Door Frames**. Door should have a vent and a Stainless Steel armor plate and kick plate on push side of door.
- Door Signage: Provide Room Sign for all Custodial and Facilities Main Storage Room Spaces on wall side adjacent to door lever.

D. Custodial Floor Finish:

- Flooring in Custodial Closets and Facilities Main Storage Room to be smooth concrete with clear coating.
- Product: Rust-Oleum's Easyclear® Epoxy Maintenance Floor Coating.
- See **Design Standard for Flooring** for more information.

E. Wall Finish:

- At the floor mounted service sink: provide Rigid Sheet Vinyl Material on the wall sides of service sink. Rigid Sheet Vinyl Material Thickness no less than 0.040" and to a height of 48 inches Above Finish Floor. Product: InPro Corp. Wall Protection, Standard Color: Antique White.
- Rest of the Walls 1st Choice: Provide FRP (fiberglass reinforced panel) to a height of four-feet (4'-0") above finish floor on all walls. Provide semi-gloss, water based epoxy paint at gypsum board above FRP, color: District Standard Navajo White.
- 2nd Choice: concrete block sealed with an epoxy resin similar to Rust-Oleum® Wet Look Concrete Sealer or equivalent.
- See **Design Standard for Interior Paint** for more information.

F. Plumbing Fixtures:

- Comply with **Design Standard for Plumbing Fixtures** for plumbing fixtures, hose bibs and floor drains in each custodial closet and custodial main storage room.
- Service Sink: Floor mounted (24" x 24" x 10"), with a chemical impervious surface and a stainless steel collar.
- Sink faucet: Bibb-type faucet with hose tread and backflow preventer installed. Install shut off values for the faucets.
- Sink Essentials: Install a mop grip-all, preferably on the wall without the faucet. Leave space on the faucet-side wall to install a chemical dilution system.
- Provide one Floor Drain with waterless trap guard per custodial closet/main storage room: nickel bronze drain with trap primer.

Approved Manufacturers:

Per above and referenced Design Standards.

Substitutes Allowed:

As noted within the standard.

Associated Design Standards and Construction Specifications

Design Standard for Door Hardware
Design Standard for Doors and Door Frames
Design Standard for Interior Paint
Design Standard for Plumbing Fixtures

End of Document

DESIGN STANDARD for Building, Floor, Room, Stairway & Elevator

Purpose:

Designations of buildings, floors, rooms, stairways and elevators are important elements in way-finding for all on a college campus. SCCD's goal is to establish naming and numbering protocols that are consistent and naturally intuitive for all end-users including students, faculty, staff, visitors and maintenance staff.

Design Standard:

1. Campus Designations

The following campus designations for the Solano Community College District are the first characters for all buildings:

FF Fairfield
VJ Vallejo
VV Vacaville
NT Nut Tree

2. Building Designations

The buildings on the Fairfield Campus are identified by number and name. The building number is the most widely recognized identification and is used in class schedules. On all other District sites the buildings are to be identified name.

3. Floor Designations

- Floor numbering will begin with the floor accessed at the *main* grade as "first floor" and will be designated with a "1."
- One floor above will be "second floor" and will be designated with a "2."
- The next floor above that will be "third floor" and will be designated with a "3" if occupied and accessed by students and faculty. If this floor is a roof it will be called "roof" and designated with a "R."
- If the Building has a basement that floor will be called "Basement" and designated with a "B."

4. Room Numbering

- Basement rooms will be designated with two-digit room numbers (e.g. 01, 02, etc.)
- In buildings identified by name (all sites except Fairfield Campus), first floor room numbers will be the 1000 series; second floor rooms will be the 2000 series, etc.
- At the Fairfield campus, where buildings are identified by number, begin numbering of spaces at the entry to the building with the first space (or corridor) being the building number. Begin upper floor room numbering with a decade number. For example Building 100: second floor room numbers might start at 130, third floor numbers might start at 170." At 5th bullet starting with "Begin", replace "for" with "or" and add a comma after "floor".
- Millennium numbers (1000, 2000, etc.) should be used for main lobbies/main circulation only.
- Begin numbering of spaces at the entry to the building for floor turning to the right and sequencing counterclockwise.
- Century or decade numbers may be assigned to departments or functional areas if it is logical to facilitate wayfinding,
- Assign alpha suffixes to rooms whose sole access is from within a room (e.g., if there are rooms within room 1010, the inner rooms shall be designated room 1010a, 1010b, etc.). Skip letters "I" and "O".
- Create number intervals to allow future assignments should subdivision occur.
- Assign numbers in sequence.
- In general, keep even numbered rooms on one side of each corridor, and odd numbered rooms on the opposite side.
- For rooms accessed only from the building exterior, once all interior first floor rooms have been assigned a number and starting from the building main entry door, move counterclockwise about the exterior of the building and continue the first floor numbering sequence to designate numbers for any rooms which are accessed only from the exterior of the building.

5. **Stairway Designations**

   - Stairways should be identified by building two-letter abbreviation or building number and the predominant cardinal direction (North, South, East and West) of its placement in the building. For example the VV101-North Stair is the Stair in the Vacaville Center on the North Side.

6. **Elevator Designations**

   - Elevators should be identified by building two-letter abbreviation or building number and the predominant cardinal direction (North, South, East and West) of its placement in the building. For example FF400-East Elevator is the Elevator in Building 400 on the Fairfield Campus located on the East side of the Building.

Approved Manufacturers:

Not Applicable

Substitutes Allowed:

Not Applicable

Associated Design Standards and Construction Specifications

Not Applicable

End of Document

DESIGN STANDARD for Door Hardware

Purpose:

Door hardware across District sites must be consistent to facilitate the logistics of keying locks and to assist in the efficiency of door maintenance. Pursuant to Public Contract Code Section 3400, the following particular products are designated by brand name in order to match other products in use on a particular public improvement (facilities on all District sites) either completed or in the course of completion. No substitutions will be accepted for these products, unless otherwise indicated.

Coordinate all hardware requirements with the Electronic Access Control System (EACS) and other requirements in the **District Standard for Electronic Safety and Security**.

Note: these Design Standards are a tool to clarify direction and streamline project execution for design professionals, construction managers and other participants in capital improvement projects. Given the logistical, and compatibility requirements with the Electronic Access Control System, **all door hardware selected by consultant must be reviewed by the Director of Facilities** and equivalent products (only where allowed) have to be approved as outlined in the ***Open this Document First: Standards Process.pdf***. In all cases the written design standards do not diminish or eliminate the standard of care owed by the consultant to SCCD or relieve, in any manner whatsoever, a consultant from any professional responsibility, duty or due diligence required toward that work.

Design Standard:

A. Exterior Door Hardware

1) Preferred Choice for Main Entrance to Buildings: Automatic Sliding Doors. See details in **District Standard on Doors and Door Frames**.

   - Hardware provided by Automatic Sliding Door Manufacturer, except for Electronic Access Control System (EACS), see **District Standard for Electronic Safety and Security**.

2) Alternate Choice for Main Entrance to Buildings: Aluminum Entrance Doors with Automatic Door Operators.

   - These Doors shall have the following features:
     - Operators shall be furnished with three-position rocker switches (on/off/hold open).
     - Hardwire all Door Operators. Radio-controlled receivers are acceptable for retrofit installations only.
     - Provide motion sensor activation system in addition to push plate activation.

- Door & Frame per Exterior Aluminum Entrance in **District Standard for Doors and Door Frames.**
- Glazing per **District Standard for Glazing**.
- Interlock the power assist's actuators with the EACS, see **District Standard for Electronic Safety and Security**.

- Product: Stanley Access Technologies *Magic Access (Low Energy)*. No substitutions allowed.

3) In new buildings with more than one major entry, provide at least one Automatic Sliding Door entry and Aluminum Entrance Doors with Automatic Door Operators at all other locations.

4) In retrofits all major entries can be Aluminum Entrance Doors with Automatic Door Operators if it is not feasible to make one of them an Automatic Sliding Door entry.

5) All other exterior doors:

- For type see **District Standard for Doors and Door Frames.** For Glazing see **District Standard for Glazing**.
- Hinges: Heavy Duty Ball Bearing Hinges with non-removable pins.
  - Finish to be non-ferrous and to match adjacent door frame.
  - Identify appropriate substrate for application; ensure substrate provides for structural integrity for support of door frame and door.
- Continuous hinges are permitted as long as backing in the jamb is provided.

6) For double doors that do not have automatic openers for both leafs, door hardware to have vertical rods; all metal and aluminum fore front doors to have concealed vertical rods.

B. Interior Doors

For Door material/finish see **District Standard for Doors and Door Frames.**

C. Locks

All doors (including doors with EACS) must have mechanical lock mechanisms, and must be keyed to the College's master key system. This protocol facilitates emergency response, ease of use, departmental control, protection of SCCD assets, and the safety and security of faculty, staff and students. No exceptions to this protocol are allowed.

1) The mechanical key system installed at SCCD is Stanley Security System's *BEST Interchangeable Core (IC)*. No substitutions allowed. Contact campus locksmith for keying on all projects.

- Locksets: ANSI A156.2, Series 4000, Grade 1 UL Listed, Extra Heavy-Duty cylindrical type.
- Interchangeable core 7-pin: District is moving to COREMAX™ Patented Keying System.
- Series: 9K.
- Lever Style: 15D.
- Lockset Finish:
  - Fairfield Campus Exterior Finish: US10B (613) Dark Oxidized Satin Bronze, Oil Rubbed.
  - Vacaville/Vallejo Exterior Finish: US26 A M (626 A M) Satin Chrome plated with UltraShield antimicrobial Finish.
  - All Interior Finish: US26 A M (626 A M) Satin Chrome plated with UltraShield antimicrobial Finish.
- Keys:
  - Best Standard 7-pin, District is moving COREMAX™ Patented Keying System.
  - All new keys will be given to the College's Locksmith in the form of blanks. No exceptions.
- Implementation:
  - All permanent cylinders and keys are to be furnished directly to the College's Locksmith for keying.
  - Specify the use of construction cores and keys for doors requiring locking during construction. Construction control and operating keys and cores are not part of permanent keying system or furnished on same keyway (or key section) as permanent keying system. Remove temporary inserts immediately prior to SCCD occupancy and return to Stanley/BEST.
- Warranty: 7 years.

2) Electronic Control Access System including Keypads, Proximity Cards etc. see **District Standard for Electronic Safety and Security**.

3) Electrified Locking:

- All electronically access controlled doors require electrified locksets.
  - Depending on application this may require a door core and an electric transfer hinge, or an electric transfer door loop for door-mounted locksets or exit devices.
  - If a door core is performed on a rated opening in the field the work should be performed by a NRTL-certified contractor so that the opening may be re-labeled in the field. (NRTL = Nationally Recognized Testing Laboratory such as UL or Intertek).
  - Lockset per this Standard shown in item #1.
  - Coordinate lockset requirements with **District Standard for Electronic Safety and Security**.
- Request-To-Exit (REX):
  - Electrified door locks and exit devices must be ordered with a request-to-exit (REX) microswitch in the door lock.
  - At pairs of doors, each door lock or exit device requires this integral request-to-exit (REX) microswitch and electric transfer hinge – even if only one of the two door leafs will be powered and operated by the Electronic Access Control System (EACS).
  - REX does not control nor operate the door lock in any way – it only shunts (temporarily disables) the "door forced" alarm in the access control system when someone exits through the door. All doors have free egress in the egress direction with no special effort or knowledge required.

- Electric Transfer Hinge:
  - BEST Cylindrical Locks require an electric transfer hinge.
  - Exit devices require an electric transfer hinge.
  - Pairs of doors require an electric transfer hinge for each door leaf for the REX as previously noted. (Exception at pair with Interchangeable Core lockset in active leaf and the inactive leaf pinned with head/foot bolts.)
- Exit Device (Panic Hardware) Local Door Power Supply:
  - Where exit devices (panic/crash bars) are scheduled with local door power supplies they shall be provided by the Door Hardware Contractor; low-voltage cabling terminations by Security Contractor; and installed with 120VAC high-voltage power by Electrical Contractor.
  - 120VAC high-voltage power is required to the local power supply at the door location. Local power supply shall be installed within 50 feet of the door location.
  - Low-voltage cabling from the local power supply to the electrified exit devices (panic/crash bars) shall be in flex conduit from the local power supply to the electric transfer hinges.
  - Local door power supplies are required where specified for the exit devices (panic/crash bars), such as when scheduled with Electric Latch Retraction function. This is due to the 16A in-rush on unlocking.
  - Typically, few doors should require the Electric Latch Retraction function, such as the main front lobby doors. Electric Latch Retraction function would also be required where doors are scheduled with Auto Door Operators typically associated with ADA accessible openings.
  - All other exit devices (panic/crash bars) should be scheduled with Electric Unlock Only which is solenoid operated and consumes less than an amp in-rush on unlocking. These exit devices (panic/crash bars) shall be powered by low-voltage power supply provided and installed in a centralized location by the Security Contractor.
  - All exit devices should also have cylindrical dogging as a secondary system. Coordinate width of door stile (where applicable) to accommodate exit device with cylindrical dogging system integrated.
  - BEST Cylindrical locksets shall also be powered by low-voltage power supply provided and installed in a centralized location by the Security Contractor.

4) Padlocks will be keyed to the College's Master Key System, as such Stanley *BEST 3 Series Heavy Duty Padlocks (similar to 41B/42B series)*, with Best Interchangeable Cores and COREMAX™ Patented Keying System should be specified.

5) Furniture & Casework that **house materials that need to be secured** (as determined by the District) should be provided with Interchangeable Cores Cabinet Locks, and keyed to the College's Master Key System. Locks shall fit flush to the cabinetry surface. Product: Stanley *BEST Cabinet Locks*.

6) Other Furniture & Casework that do NOT house materials that need to be secured specify: *Olympus Locks with Small Format BEST Interchangeable Cores* or equivalent.

D. Other Hardware

All hardware to be 626 Satin Chrome finish or 630 Satin Stainless Steel finish unless otherwise noted.

1) Hinges: ANSI Heavy Duty Ball Bearing Hinges with non-rising pin (NRP).

- Stainless Steel (630) typical interior and exterior, except at Fairfield Campus exterior locations where Brass, Antique Bronze, Oiled (613) should be used.
- Unless otherwise specified, the size of the butts will be determined by the following table:
  - Doors 1-3/8 inch thick to have 3-1/2 inch.
  - Doors 1-3/8 inch thick and up to 41 inch wide to have 4-1/2 inch.
  - Doors 1-3/4 inch thick, 42 inch to 48 inch wide, to have 4-1/2 inch extra heavy.
  - Doors 2 inches thick and over 48 inches wide to have 5 inch extra heavy.
- Provide widths sufficient to clear trim projection when door swings 180 degrees.
- Provide 2 hinges to 60 inches high, 3 hinges to 90 inches high, 4 hinges to 120 inches high for each door leaf.
- Products: *Hager BB 1199 NRP* or equivalent.
- Full height metal hinges not allowed, including at storefront doors.

2) Exit Devices to be touch bar design, rim and concealed rod types.

- Use key removable and rim devices at pairs of doors.
- Use Interchangeable Cylindrical Cores at panic devices.
- All exit devices at non-rated doors to have Cylinder dogging (CD).
- All exit devices at fire-rated doors to have double cylinder (BEST Intruder Function).
- Products: Stanley *Precision Hardware Apex 2000 Series Exit Device*, select specific exit device appropriate for specific application. No Substitutions allowed. This product has been selected because it integrates with District Locksets and District Electronic Access Control System.

3) Surface Closers to be heavy-duty, for institutional use.

- Non-handed for ease of maintenance/re-installation by maintenance staff.
- Must comply with Building Code requirements for opening force.
- Provide hold-open arm for non-rated conditions.
- Product: *Exterior Doors - Stanley Door Closers D-4550/D-4551 Series* selected as appropriate for specific application. Interior Doors - *Stanley Door Closers D-3550/ D-3551 Series* selected as appropriate for specific application. No Substitutions allowed.

4) Floor Closers: District preference is to not use Floor Closers. Exceptions need to be approved by Director of Facilities for Solano CCD.

5) Flush Bolts:

- Manual Flush Bolts typical.
- Auto Flush Bolts at Fire Doors with Panic Hardware and I.T. Rooms.
- Product: *IVES: FB 30,40,50, 60 Series* or equivalent.

6) Pivots shall be in ground, 3/4" offset, and stainless steel finish. *Ives 7215 series* or equivalent.

7) Stops:

- Wall Stops are preferred. *Ives WS443* or equivalent.
- Avoid Floor Stops to best extent possible.
- Overhead Stops: use only where wall or floor stops are inadvisable, and must be approved by Director of Facilities for Solano CCD. Use in coordination with extra heavy duty hinges.
- Automatic Door Holder/Stop where required: *Ives WS45* or equivalent.

8) Seals shall be adjustable screw type with silicone underneath, no adhesive types allowed. *Pemko, National Guard Products* or equivalent.

9) Thresholds to be coordinated with project conditions. Aluminum typical finish, except at Fairfield Exterior locations where Bronze should be specified. *Pemko* or equivalent.

10) Door Plates:

- Provide Stainless Steel Kick Plates 10" high x Door Width minus 2 inches at all Restrooms and High Use Rooms.
- Provide 30" high Stainless Steel Armor Plates at push side of Custodial Closets and Main Storage Rooms.
- *Ives, Pemko* or equivalent.

11) Vertical Rods:

- Provide vertical rods for all double doors.
- Metal and aluminum storefront double doors to have concealed vertical rods.

12) ADA Access Touch Panels and Bollard Posts:

- Provide 36" ADA access wall-mounted touch panel where possible.
- Touch panel: Security Door Controls, Model #482AA36 Touch panel 36", finish 628 Aluminum, blue infill, DPDT.
- Bollard Post (where cannot use wall-mounted touch panel): Security Door Controls, Model #BRSG6 54" In-Ground, 6" square post, 628 Aluminum finish; with 36" touch panel.
- Wireless transmitter and receiver if needed.

Approved Manufacturers:

As noted within this standard.

Substitutes Allowed:

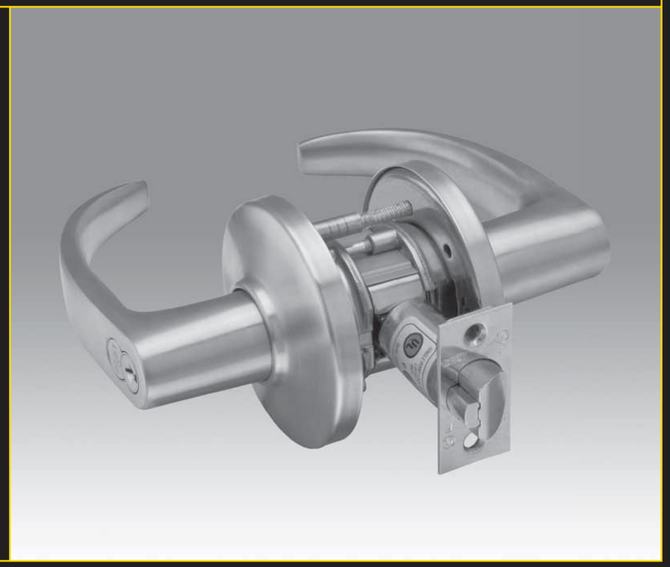
As noted within this standard.

Associated Design Standards and Construction Specifications

Design Standard on Electronic Safety and Security Standards.
Design Standard on Doors and Door Frames.
Design Standard on Glazing.

Cutsheet Attachments:
Stanley Security Solutions, BEST 9K Series Heavy Duty Locks-Levers
Partial Stanley Security Solutions 3 Series Padlocks
Partial Stanley Security Solutions Door Closers D-4550-D-4551
Partial Stanley Security Solutions Exit Devices Apex 2000 Series

STANLEY
Security Solutions



9K SERIES

HEAVY DUTY LOCKS - LEVERS

STANLEY BEST ACCESS SYSTEMS

TABLE OF CONTENTS

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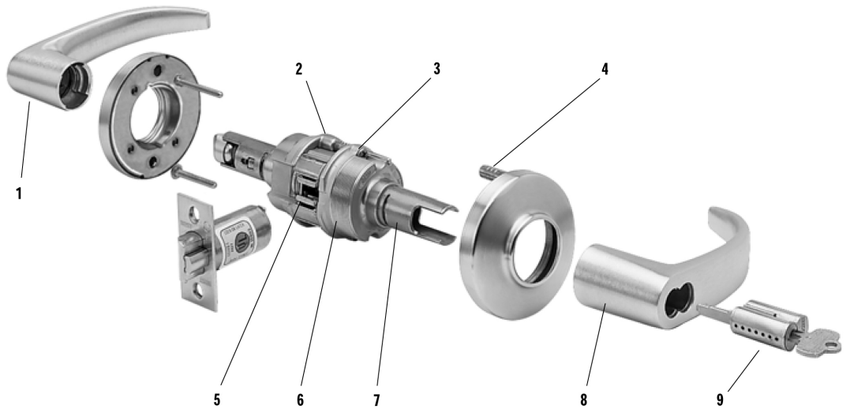
Lever Styles & Trim	4	9K Sample Specifications	11
CORMAX™ Patented Keying System	10	Service Equipment	12

FEATURES

1. For versatile applications, lever by knob trim variations are available.
2. Rose locking pin and rose assembly design offers great torque resistance. It prevents the locking pin from twisting, bending, or breaking under attack.
3. The innovative design of the slotted key release cam and locking lug assembly create maximum attack resistance. Even though damaged, the lock still allows key access. In addition, the lever is fully functional from the inside. The hub-mounted torsion spring and strong retractor springs help prevent lever sag and offer a smooth and snappy operation.
4. Strong through-bolt mounting studs increase torque resistance. Heavy rose liner material is highly attack resistant.
5. Strong retractor springs provide resistance to lever sag.
6. Zinc hubs with a shrouded locking lug, guaranteeing higher quality and increased torque resistance.
7. The outside lever sleeve is a seamless one piece construction made of a hardened steel alloy that provides additional reinforcement in the locking lug slot.
8. Lost Motion feature available allowing 45° lever rotation in either direction without engaging retractor assembly.
9. Interchangeable core allows for quick re-keying and customized masterkeying.



9K – EXPLODED

STANLEY BEST ACCESS SYSTEMS

HEAVY DUTY L

SPECIFICATIONS

ADA–Americans With Disabilities Act:
9K series – The design and operation of the BEST® cylindrical lock meets the intent of the standard for ANSI A117.1 section 404.2.6

Builders Hardware Manufacturers Association:
9K series – Listed by BHMA for A156.2, Series 4000, Grade 1.

Underwriters Laboratories®:
9K series – Listed by Underwriters Laboratories for use on 3 Hr, A label for single or double swinging doors.

Florida Building Code and Miami-Dade County Code:
9K series – 9/16" latch throw – Listed by Florida Building Code and Miami-Dade County at ± 75 PSF for single doors.

9K series – 3/4" latch throw – Listed by Florida Building Code and Miami Dade County at ± 80 PSF for single doors and ± 50 PSF for double doors.

California State Fire Marshal:
9K series – Listed with California State Fire Marshal.
9K series 14 & 15 lever conforms with California Title 24.

Backset – 2 3/4" standard, 3 3/4" and 5" available.

Chassis – Critical latch and chassis components are brass or corrosion-treated steel. 2 1/16" diameter to fit 2 1/8" hole in door . (Conforms to ANSI A115.2). Lost Motion feature available as an option. (see page 5 for options/features).

Door thickness – Available for 1 3/4" to 2 1/4" doors only. Spacers available for 1 3/8" doors.

Roses – **C** – 3" Convex; **D** – 3 1/2" Convex; **K** – 3" Convex-no ring; **L** – 3 1/2" Convex-no ring

Products protected by one or more of the following patents:
5,590,555 5,794,472 Other products patent pending.

Finish – (BHMA)	US	DESCRIPTION
605	3	bright brass
606	4	satin brass
611	9	bright bronze
612	10	satin bronze
613	10B	oxidized satin bronze, oil rubbed
618	14	bright nickel plated
619	15	satin nickel plated
622	19	flablack
625	26	bright chromium plated
626	26D	satin chromium plated
690	20	dark bronze

Antimicrobial Finish
626AM satin chrome plated with UltraShield™ antimicrobial protected coating

The Stanley Security Solutions UltraShield™ finish inhibits the growth of bacteria and other microbes on the surface of the hardware.

NOTE: Stanley's UltraShield™ option is recommended for use on any hardware application where product cleanliness is a high priority. i.e;. Hospital/Healthcare, Elderly Care, Education, Transportation, Food-Service, Hospitality.

Latch – Solid brass 9/16" throw. Front 2 1/4" x 1 1/8" beveled.

Lever handles – Lever handles are a high-quality zinc alloy. Trim components are brass or bronze. Body is approximately 5/8" in diameter; Handle is approximately 4 3/4" long (from center-line of chassis). #14 and #15 levers conform to California Administrative Code Title 19 and Title 24. All three styles of levers conform to the Illinois Accessibility Standard.

Mounting – In addition to standard door preparation (ANSI A115.2 for 1 3/4" doors), two additional holes are needed for through-bolts. Through-bolts require two 5/16" diameter holes located at 12 o'clock and 6 o'clock positions. A drill jig can be ordered to insure accuracy of the holes. (see KD303 page 5).

Projection on door – Approx. 2 3/4" when mounted on 1 3/4" door.

Strike – STK: Conforms to ANSI A115.2 (2 3/4" x 1 1/8" with curved lip & box). S3: Conforms to ANSI A115.2 for 1 3/4" doors (4 7/8" x 1 1/4" with curved lip). S3-7/8: Conforms to ANSI A115.2 for 1 /4" doors (4 7/8" x 1 7/8" flat)

HOW TO ORDER

9K	3	7	AB	15	A	STK	626	
Series	**Backset**	**Core Housing**	**Function Code**	**Lever Style**	**Rose Style**	**Strike Package**	**Finishes**	**Options**
9K	**3** – 2 3/4" **4** – 3 3/4" **5** – 5"	**0**– keyless **7**– 7-pin housing accepts all BEST® cores	**AB**– entrance **D**– storeroom **L**– privacy **N**– passage **R**– classroom etc.	**14**– curved return **15**– contour angle return **16**– curved no return	**C**– 3" convex **D**– 3 1/2" convex **K**– 3" convex - no ring **L**– 3 1/2" convex - no ring	**STK**– 2 3/4" ANSI **S3**– 4 7/8" ANSI **S3– 7/8**- 7/8" flat strike	**605 606** **611 612** **613 618** **619 622** **625 626** **690**	**AL**– abrasive lever **LL**– lead lined **LM**– lost motion **RQE**– request to exit** **SH**– security head screws **TL**– tactile lever **3/4**– 3/4" throw latch **7/8" LTC**– flat lip strike **NOTE:** specify inside (I), outside (O), or both (B) for AL,TL options
	pages 6-9			pages 4-5	pages 4-5	page11		page 5

*Handles are made from a zinc alloy, and have been plated to be equivalent in appearance to the finishes listed.
For information on 9K non-IC products please refer to BEST's non-IC keying products brochure.
**RQE option requires modification to chassis and is sold with assembly unit only.

SPECIFICATIONS
HOW TO ORDER

SHIPPING WEIGHTS
LEVER STYLES AND TRIM

SHIPPING WEIGHTS

The chart is the approximate shipping weight for the standard 9K functions locksets. This weight includes the weight of the lockset with the "#15" style lever, "K" style rose, latch, strike package, and box. Listed separately are the approximate weights for "with core" and "less core" shipments.

Lock Function Nomenclature	Case Quantity	Shipping Weight With core	Shipping Weight Less Core
Y	9		31 lbs.
N	9		40 lbs.
L,NX,P	9		40 lbs.
AB,D,E,H,HJ,R,T	9	42 lbs.	40 lbs.
C,G,IN,S,W	9	44 lbs.	40 lbs.

LEVER STYLES AND TRIM


14C


15C


16C


14D


15D


16D


14K


15K


16K


14L


15L


16L

LEVER FEATURES

Abrasive Lever Option
Besides complying with a wide variety of accessibility codes and ordinances, Best Access Systems lever handles are available with a special abrasive feature. Abrasive strip on the lever immediately identifies warnings on doors to hazardous areas for the blind.
To order: Designate **"AL"** on How to Order (page 3). Note: abrasive strip is available on all levers, except #14, #15, #16 levers in 613 finish.

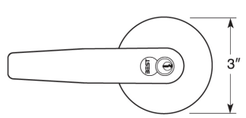
Lost Motion Feature
The Lost Motion feature allows the lever handle to move 45 degrees from parallel to the horizontal plane without engaging the latchbolt assembly. When the lockset is in the locked mode, this feature makes over-torque or over-lever-age abuse more difficult to achieve.
To order: designate **"LM"** on How to Order (page 3).

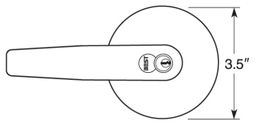
Non IC Lever Option
The 9K heavy duty cylindrical lock may be adapted to existing keying systems by using a special retrofit lever and throw member that will accept 6 pin single shear-line cylinders from non BEST manufacturers. No internal modifications are required to adapt the 9K to cylinders from the following manufacturers: Corbin-Russwin, Medeco, Sargent, Schlage, Yale. Refer to BEST® non-IC keying products brochure for more details.

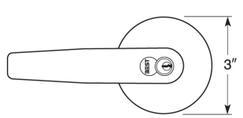
RQE Feature
The 9K lever handle cylindrical can be built to incorporate a request-to-exit (RQE) switch. A normally open switch provides momentary switch closure when the inside lever is rotated. RQE option requires modification to chassis and is sold with assembly unit only.
To order: designate **"RQE"** on How to Order (page 3).

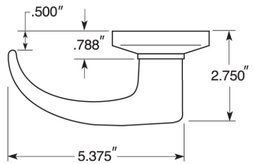
Tactile Lever Option
Tactile levers may be used in areas where improved grip is required or as a warning in hazardous areas. Grooves are machined into the back of the hand grasp portion of the lever to improve grip and/or to provide a sensory warning in hazardous areas. This option can be used for Blind, Safety or Accessibility applications. **To order:** Designate **"TL"** on How to Order (page 3).

LEVER & TRIM DIMENSIONS

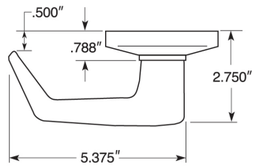




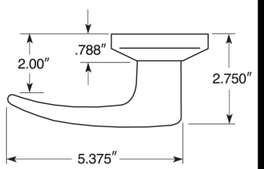




#14C or #14K Trim
("C" rose shown)



#15D or #15L Trim
("D" rose shown)



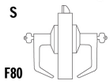
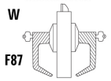
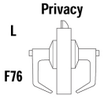
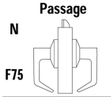
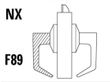
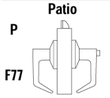
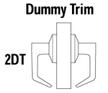
#16C or #16K Trim
("K" rose shown)

FUNCTIONS

Function & Diag. (ANSI No.)	Description	Outside Lever		Inside Lever	
	Latch operated by	Locked by	Unlocked by	Locked by	Unlocked by
Single Keyed					
Entrance AB F109	• Rotating the inside lever, • Rotating the outside lever– only when the inside push button is out, • Turning the key in the outside lever	• Pushing the inside button, • Pushing and turning the inside button. Turning the button keeps the outside lever locked until the button is turned back	• Turning the key in the outside lever, (only when the button is not turned) • Rotating the inside lever, (only when the button is not turned). • Closing the door (only when the button is not turned)	Cannot be locked	Always unlocked
Storeroom D F86	• Turning the key in the outside lever, • Rotating the inside lever	Always fixed	Cannot be unlocked	Cannot be locked	Always unlocked
Service Station E F92	• Rotating the inside lever, • Rotating the outside lever-only when the inside push button is out. • Turning the key in the outside lever	• Pushing the inside button, • Pushing and turning the inside button. Turning the button keeps the outside lever locked until the button is turned back	• Turning the key in the outside lever, • Rotating the inside lever, • Closing the door-only when the button is not turned, • Turning back the slotted button	Cannot be locked	Always unlocked
Hotel Guest Room H F93	• Rotating the inside lever, • Turning the key in the outside lever-only when the inside push button is out, • Removing the core with a control key and using a special emergency key	Always fixed	Key block feature is released by: • Rotating the inside lever, • Closing the door	Cannot be locked	Always unlocked
Indicator Included	Pushing the inside button projects an "occupied" indicator in the outside lever and blocks all operating keys.				
Hotel Guest Room HJ	• Rotating the inside lever, • Turning the key in the outside lever-only when the inside push button is out, • Removing the core with a control key and using a special emergency key	Always fixed	Key block feature is released by: • Rotating the inside lever, • Closing the door	Cannot be locked	Always unlocked
No Indicator	Pushing the inside button blocks all operating keys, but no "occupied" indicator is projected.				
Classroom R F84	• Rotating the inside lever, • Turning the key in the outside lever, • Rotating the outside lever when not locked by key	Turning the key in the outside lever	Turning the key in the outside lever	Cannot be locked	Always unlocked
Dormitory T F90	• Rotating the inside lever, • Rotating the outside lever when not locked by key or push button	• Turning the key in the outside lever, • Pushing the button on the inside lever	• Turning the key in the outside lever, • Rotating the inside lever (only when locked by push button), • Closing the door (only when locked by push button)	Cannot be locked	Always unlocked
Double Keyed*					
Corridor C F88	• Rotating the inside lever, • Rotating the outside lever when not locked by key, • Turning the key in the outside lever	Turning the key in the inside lever	Turning the key in the inside lever	Cannot be locked	Always unlocked
Storeroom * G F91	• Rotating the outside lever when not locked by key, • Rotating the inside lever when not locked by key	• Turning the key in the inside lever, • Turning the key in the outside lever	• Turning the key in the inside lever, • Turning the key in the outside lever	• Turning the key in the inside lever, • Turning the key in the outside lever	• Turning the key in the inside lever, • Turning the key in the outside lever
	Turning the key in either the inside or the outside, locks or unlocks both sides.				

*ATTENTION: Locksets that secure both sides of the door are controlled by building codes and the Life Safety Code. In an emergency exit situation, failure to quickly unlock the inside lever could be hazardous or even fatal.

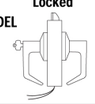
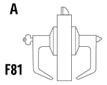
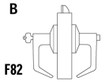
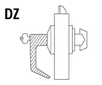
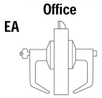
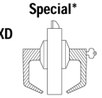
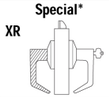
FUNCTIONS

Function & Diag. (ANSI No.)	Description	Outside Lever		Inside Lever	
	Latch operated by	Locked by	Unlocked by	Locked by	Unlocked by
Double Keyed (Continued)					
Intruder IN 	• Rotating inside lever, • Rotating outside lever only when not locked by inside or outside key	• Turning key in the inside lever, • Turning the key in the outside lever	• Turning key in the inside lever, • Turning the key in the outside lever	Cannot be locked	Always unlocked
Communicating* S F80 	• Turning the key in the inside lever, • Turning the key in the outside lever, • Rotating the inside or outside lever (if unlocked)	Turning the key in the outside lever	Turning the key in the outside lever	Turning the key in the inside lever	Turning the key in the inside lever
	Turning the key in either lever, locks or unlocks its own lever independently.				
Institutional* W F87 	• Turning the key in the inside lever, • Turning the key in the outside lever	Always fixed	Cannot be unlocked	Always fixed	Cannot be unlocked
Keyless					
Privacy L F76 	• Rotating the inside lever • Rotating the outside lever only when the inside push button is out	Pushing the inside button	• Rotating the outside slotted button, • Rotating the inside lever, • Closing the door.	Cannot be locked	Always unlocked
Passage N F75 	• Rotating the inside lever, • Rotating the outside lever	Cannot be locked	Always unlocked	Cannot be locked	Always unlocked
Exit NX F89 	Rotating the inside lever	Always fixed	Always fixed	Cannot be locked	Always unlocked
Patio P F77 	• Rotating the inside lever, • Rotating the outside lever only when the inside push button is out	Pushing the inside button	• Rotating the inside lever, • Closing the door	Cannot be locked	Always unlocked
Exit Y 	Rotating the inside lever			Cannot be locked	Always unlocked
Single Dummy Trim 1DT 	This is a single, surface-mounted lever for an inactive door or a non-latching door				
Double Dummy Trim 2DT 	This is a through bolt mounted pair of matching levers for an inactive door or a non-latching door				

*ATTENTION: Locksets that secure both sides of the door are controlled by building codes and the Life Safety Code. In an emergency exit situation, failure to quickly unlock the inside lever could be hazardous or even fatal.

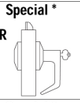
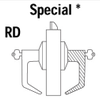
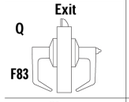
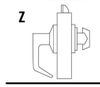
FUNCTIONS

FUNCTIONS

Function & Diag. (ANSI No.)	Description			Inside Lever	
	Latch operated by	Locked by	Unlocked by	Locked by	Unlocked by
Electromechanical					
Electrically Locked DEL 	• Rotating the inside lever, • Rotating the outside lever only when power is off, • Turning the key in the outside lever	• Applying 24 Volts DC. • Outside lever remains locked only while power is on	Switching off 24 Volts DC	Cannot be locked	Always unlocked
Electrically Unlocked DEU 	• Rotating the inside lever, • Rotating the outside lever only when power is on, • Turning the key in the outside lever	Switching off 24 Volts DC	• Applying 24 Volts DC • Outside lever remains unlocked only while power is on	Cannot be locked	Always unlocked
Special					
Dormitory or Storeroom A F81 	• Rotating the inside lever, • Rotating the outside lever only when inside turn button is in unlocked position, • Turning the key in the outside lever	Turning the inside button	Turning the inside button	Cannot be locked	Always unlocked
	NOTE: Turn button must be manually rotated to unlock the outside lever.				
Office B F82 	• Rotating the inside lever, • Rotating the outside lever only when inside push button is out, • Turning the key in the outside lever	Pushing the inside button		Cannot be locked	Always unlocked
	NOTE: Push button is released by turning the key in the outside lever, OR rotating the inside lever. Closing the door does not release the push button.				
Closet or Storeroom DZ 	• Turning the key in the outside lever, • Turning the inside closet turn knob	Always fixed	Cannot be unlocked	Closet turn knob cannot be locked	Closet turn knob always free
Entrance or Office EA 	• Rotating the inside lever, • Rotating the outside lever only when inside push button is out, • Turning the key in the outside lever	• Pushing the inside button, • Pushing and turning the inside button. Turning the slotted button keeps the outside lever locked until the button is turned back	• Turning the key in the outside lever, • Rotating the inside lever, • Turning the slotted button back	Cannot be locked	Always unlocked
Closet or Storeroom RZ 	• Turning the key in the outside lever, • Turning the inside closet turn knob, • Rotating the outside lever when not locked by key	Turning the key in the outside lever	Turning the key in the outside lever	Closet turn knob cannot be locked	Closet turn knob always free
Special* XD 	Turning the key in the inside lever	Always fixed	Cannot be unlocked	Always fixed	Cannot be unlocked
Special* XR 	• Turning the key in the inside lever, • Rotating the inside lever when not locked by key	Always fixed	Cannot be unlocked	Turning the key in the inside lever	Turning the key in the inside lever

*ATTENTION: Locksets that secure both sides of the door are controlled by building codes and the Life Safety Code. In an emergency exit situation, failure quickly unlock the inside lever could be hazardous or even fatal.

FUNCTIONS

Function & Diag. (ANSI No.)	Description	Outside Lever		Inside Lever	
	Latch operated by	Locked by	Unlocked by	Locked by	Unlocked by
Special (Continued)					
Exit * YD 	Turning the key in the inside lever			Always fixed	Cannot be unlocked
Special * YR 	• Turning the key in the inside lever, • Rotating the inside lever when not locked by key			Turning the key in the inside lever	Turning the key in the inside lever
Special * DR 	• Rotating the inside lever only when not locked by key, • Turning the key in the outside lever, • Turning the key in the inside lever	Always fixed	Cannot be unlocked	Turning the key in the inside lever	Turning the key in the inside lever
Special * RD 	• Rotating the outside lever only when not locked by key, • Turning the key in the outside lever, • Turning the key in the inside lever	Turning the key in the outside lever	Turning the key in the outside lever	Always fixed	Cannot be unlocked
Hospital Privacy LL 	• Rotating the inside lever, • Rotating the outside lever only when the inside push button is out	Pushing the inside push button	• Turning the turn button in the outside lever, • Rotating the inside lever, • Closing the door	Cannot be locked	Always unlocked
Communicating* M F78 	• Rotating the inside lever-only when the outside turn button is in the unlocked position, • Rotating the outside lever-only when the inside turn button is in the unlocked position	Turning the inside turn button	Turning the inside turn button	Turning the outside turn button	Turning the outside turn button
	NOTE: Do not use this function for rooms that have no other entrance.				
Exit Q F83 	• Rotating the inside lever, • Rotating the outside lever-only when the inside turn button is in the unlocked position	Turning the inside turn button	Turning the inside turn button	Cannot be locked	Always unlocked
Closet Z 	• Rotating the outside lever, • Turning the inside closet turn knob	Cannot be locked	Always unlocked	Closet turn knob cannot be locked	Closet turn knob is always free

*ATTENTION: Locksets that secure both sides of the door are controlled by building codes and the Life Safety Code. In an emergency exit situation, failure to quickly unlock the inside lever could be hazardous or even fatal.

CORMAX™ PATENTED KEYING SYSTEM

BEST® CORMAX™ is the premier patented keying system offered by Stanley Security Solutions. CORMAX will meet your needs for security, key control, and convenience. A simple solution with no compromising allowed.

CORMAX is the upgrade path for existing BEST Standard, Premium, and MX8 customers; and it is an essential element of non-residential access control as security administrators strive to eliminate the unauthorized duplication of keys.

CORMAX™ Patented Keying System

CORMAX offers the following features and benefits:

- A long-term US utility patent that guarantees the extended useful life of the system through 2027.
- A second, independent locking mechanism that utilizes a patented set of built-in side pins to provide higher security.
- Several levels of geographical exclusivity, including national exclusivity, are available via the patented side pin feature.
- CORMAX cores and keys are available exclusively through Stanley sales offices. Key blanks are only sold to individuals authorized by the customer to ensure key blanks do not end up in the possession of unauthorized personnel either inside or outside the customer's facility.
- CORMAX cores are certified to meet the security, safety, and reliability requirements of BHMA A156.5 Grade 1.
- Picking and drilling resistance options are available if higher levels of security are desired.
- Complete factory masterkeying service offered, and at no charge with purchase of BEST locksets and PHI exit devices.
- Keyways are organized in families of four keyways each, with double-milled and quad-milled key levels to facilitate the design of masterkey systems in multi-building campuses.
- BEST CORMAX cores are compatible with all existing BEST interchangeable core housings, eliminating the need for new or modified locksets.

DEADLOCKING LATCHES & STRIKES

8KL3 Deadlocking Latch
Bolt throw – 9/16″
Backset – 2 3/4″
Front – 2 1/4″ x 1 1/8″ beveled.
Tube – To fit 1″ diameter hole in door edge.
To order: (wit h unit) designate "9K3" on How to Order (page 3).
To order: (without unit) designate "8KL3-SL" (Spring Latch) or DL (Deadlocking Latch) and finish.

8KL4 Deadlocking Latch
Bolt throw – 9/16″
Backset – 3 3/4″
Front – 2 1/4″ x 1 1/8″ beveled.
Tube – To fit 1″ diameter hole in door edge.
To order: (with unit) designate "9K4" on How to Order (page 3).
To order: (without unit) designate "8KL4-SL" (Spring Latch) or DL (Deadlocking Latch) and finish.

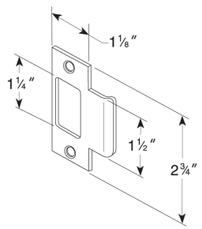
8KL5 Deadlocking Latch
Bolt throw – 9/16″
Backset – 5″
Front – 2 1/4″ x 1 1/8″ beveled.
Tube – To fit 1″ diameter hole in door edge.
To order: (with unit) designate "9K5" on How to Order (page 3).
To order: (without unit) designate "8KL5-SL" (Spring Latch) or DL (Deadlocking Latch) and finish.

8KS3–7/8 Flat Strike
Dimension: Conforms to ANSI A115.2 for 1 3/4″ doors (4 7/8″ x 1 7/8″ flat)
To order: (with unit) designate "S3-7/8″ on How to Order (page 3).
To order: (without unit) designate 8KS3-7/8 and finish.

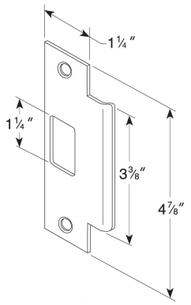
8KS3 Strike
Dimension: Conforms to ANSI A115.2 for 1 3/4″ doors (4 7/8″ x 1 1/4″ with curved lip).
To order: (with unit) designate "S3" on How to Order (page 3).
To order: (without unit) designate 8KS3 and finish.

8KS2 Strike (Supplied Standard)
Dimension: Conforms to ANSI A115.2 for 1 3/8″ doors (2 3/4″ x 1 1/8″ with curved lip and box).
To order: (with unit) designate "STK" on How to Order (page 3).
To order: (without unit) designate 8KS2 and finish.

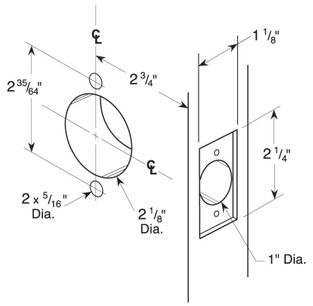
STRIKES & DOOR PREPARATION



STK strike (standard)



S3 strike



9K door preparation with through-bolt mountings

SAMPLE SPECIFICATION ACCEPTABLE MANUFACTURERS

A. Locksets and Latchsets

Stanley/BEST - No Substitution.

1.Locksets and latchsets: ANSI A156.2, Series 4000, Grade 1 UL listed, extra heavy-duty cylindrical type.
2.Backset 2 3/4 inches (70mm)
3.Interchangeable core 7-pin: [Restricted keyway] [Patented] [Standard] [_____].
4.Locksets to have anti-rotational studs that are through-bolted.
5.Keyed lever with no exposed keeper hole.
6.Each lever to have independent spring mechanism designed to control lever only.
7.Outside lever sleeve seamless, 1-piece construction, hardened steel alloy.
8. Keyed Lever: Removable only after core is removed, by authorized control key, to allow access to knob keeper
9.Hub, side plate, anti-rotational studs 1-piece casting with shrouded locking lug.

B. Keys and Keying

A.Cylinders: 7-pin, interchangeable core and keyed into a [New] [Existing] factory registered Grand Masterkey System with a [Standard] [Restricted] [Patented] keyway.
1. Acceptable Material: Cylinders as manufactured by Stanley/BEST.

B.Provide construction cores and keys during construction period. Construction control and operating keys and cores are not part of permanent keying system or furnished on same keyway (or key section) as permanent keying system.

C.Permanent Keys and Cores: Prepare permanent cores and keys in accordance with keying schedule. [Stamp with applicable key mark for identification.] [Do not stamp.] [_____].

D.Provide Grand Masterkeys, Masterkeys and other Security Keys.

E.Furnish keys in the following quantities:
1. [4] [_____] each Grand Masterkeys.
2. [4] [_____] each Masterkeys per set.
3. [2] [_____] each Change keys each keyed core.
4. [6] [_____] each Construction masterkeys.
5. [2] [_____] each Control keys.
6. Install permanent cores in locksets.

F. Return construction cores to [{Stanley/BEST} factory representative] [Hardware manufacurer's representative].

SERVICE EQUIPMENT

KD304A Boring Jig Kit

The KD304A jig kit is made for boring cut-outs in wooden doors for Fed. Spec. 160 and 161 series cylindrical/tubular locksets, doors 1 3/8" to 2 1/4" thick. The KD304A kit includes the boring jig (to drill wood doors for 2 3/8", 2 3/4", 3 3/4", and 5" backsets), a quick-release adaptor for 3/8" drill chuck, a 2 1/8" bit, and a 1" diameter x 9" bit.

The following kit items can also be purchased separately.

KD309 – 2 1/8" bit
KD318 – 1" dia. x 9" bit
KD319 – 3/8", quick release adaptor
To order complete kits specify: KD304A Kit

KD312 and KD315 Face Plate Marking Chisel and KD325 Strike Plate Location Pin

The KD315 face plate marking chisel (which locates the mortising for the faceplate) and the KD325 strike locating pin (which centers the strike for proper installation) and is used for Fed. Spec. 161 cylindrical lockset, (1 1/8" x 2 1/4"), and BEST® series 82T & 83T tubular locks. The KD312 face plate marking chisel is available for Fed. Spec. 160 (1" x 2 1/4") preparation.
To order specify:
KD312– face plate marking chisel 1" (160)
KD315– face plate marking chisel 1 1/8" (161)
KD325– strike plate locating pin

KD303 Through-Bolt Drill Jig

Special accessory jig aids in aligning 5/16" holes for through-bolt mounting. Install the latch first, then insert jig in 2 1/8" bored hole, align with door edge and drill with 5/16" drill bit.
To order specify: KD303.

KD317 Spanner Wrench and KD340 Spring Tool

All 9K locksets require the use of KD317 spanner wrench for door removal. This tool is included 1 per every 9 locksets with your order. If more are needed, desnate KD317 on your order. The KD340 lever return spring tool with its unique design feature is used when replacing the 9K lever return spring.
To order specify: KD340.

KD304A parts

KD304A with case

KD315
(Fed. Spec. 161)

KD325

KD303-9K

KD317
Spanner Wrench

KD340
Spring Tool

For more information on Stanley Security Solutions' products, services, and office locations visit our web site at www.stanleysecuritysolutions.com

STANLEY
Security Solutions

Stanley Security Solutions, Inc.
6161 E. 75th Street Indianapolis, Indiana 46250

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BAS008

STANLEY®
Security Solutions

3 SERIES

PADLOCKS

STANLEY BEST ACCESS SYSTEMS

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GENERAL INFORMATION

At the heart of every Stanley/Best padlock is a standard key removable core that is interchangeable throughout most of the entire line of BEST® products. This standardization permits Stanley/BEST locks of any type, size or style to be masterkeyed into one system which can expand to include future locking needs.

All padlocks utilize the interchangeable core which allows immediate rekeying at minimal cost. Padlocks are available in various case sizes and brass or stainless steel shackle sizes (see chart below). Brass or aluminum cases with brass shackles are also available. Options include key retained / non-key retained, bronze or steel chains, special case embossing (Brass case only), corrosion resistance, car seal. See pages 6-9 for a complete list of options available.

PATENTS

Products protected by one or more of the following patents:

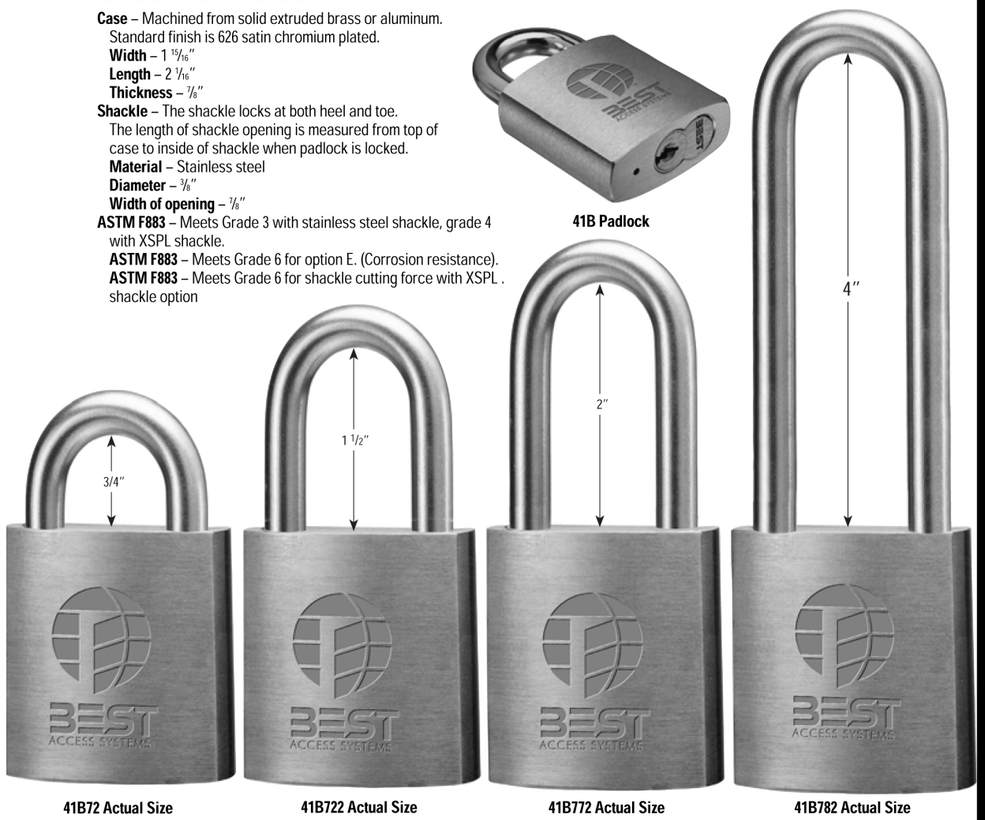
3,603,123	4,075,878	3,882,699	3,850,014
3,652,114	3,728,879	3,605,458	4,244,093
4,386,510	4,424,693	4,444,034	4,655,063
D290,085	5,590,555	5,794,472	

TÜV USA
Member of TÜV NORD Group

SPECIFICATIONS

Case – Machined from solid extruded brass or aluminum. Standard finish is 626 satin chromium plated.
Width – 1 15/16″
Length – 2 1/16″
Thickness – 7/8″
Shackle – The shackle locks at both heel and toe. The length of shackle opening is measured from top of case to inside of shackle when padlock is locked.
Material – Stainless steel
Diameter – 3/8″
Width of opening – 7/8″
ASTM F883 – Meets Grade 3 with stainless steel shackle, grade 4 with XSPL shackle.
ASTM F883 – Meets Grade 6 for option E. (Corrosion resistance).
ASTM F883 – Meets Grade 6 for shackle cutting force with XSPL . shackle option

41B Padlock



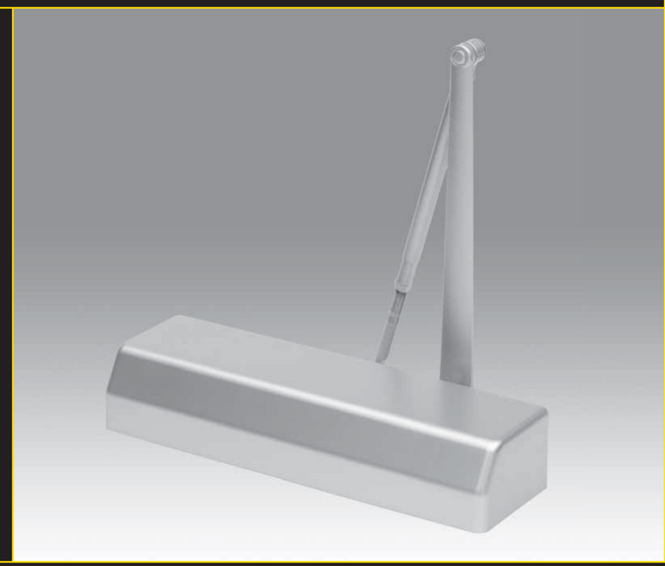
41B72 Actual Size | 41B722 Actual Size | 41B772 Actual Size | 41B782 Actual Size

41B/42B HOW TO ORDER

41B	7	2	T			
Series	**Core Housing**	**Shackle Height**	**Function Code**	**Chain Option**	**Special Stamp No.**	**Options**
41B – brass 3/8″ diameter **42B** – aluminum 3/8″ diameter	**7** – 7 pin housing all BEST® cores	**Steel** 2 – 3/4″ 22 – 1 1/2″ 72 – 2″ 82 – 4″ **Brass** 0 – 3/4″ 20 – 1 1/2″ 70 – 2″ 80 – 4″	**T** – key retained **L** – non-key retained	**M** – case drilled for chain **M1** – bronze chain (41B only) **M5** – galvanize steel chain with gray polycoating (page 8)	Blank – BEST® logo Specify padlock stamp number or describe stamp. (41B only.) Price for special stamps on request. (page 8)	**606** – satin brass (41B only) **S** – car seal slot (41B only) **WC** – weather cover **XSPL** – cut resistant shackle **Red** – anodized finish (42B only) **7** – anodized finish (42B only) (page 6–9)

O C K S

STANLEY
Security Solutions



DOOR CLOSERS

D-4550 / D-4551 SERIES

STANLEY

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How To Order	4	Track Rail Arm (Pull) Application	9
Standard (Pull) Application	5	Electronic Hold Open (Push) Applications	10
Parallel Arm (Push) Application	6	Electronic Hold Open (Pull) Applications	11
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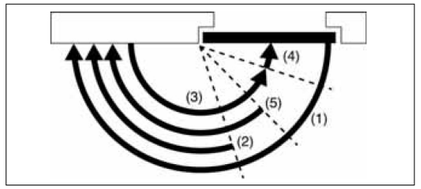
INTRODUCTION

The model D4550 Series is Stanley's best performing Heavy Duty Closer. The cylinder body is manufactured using R-14 Silicon Aluminum Alloy providing superior strength and durability on institutional applications. Available in a variety of standard and heavy-duty arm configurations accommodating a broader range of today's growing architectural application requirements.

Features
Fully Hydraulic Checking Controls the door through the entire opening and closing cycles by providing adjustable backcheck upon opening and adjusting general and latch speeds through the closing cycle.



(1) opening swing, no checking
(2) backcheck (3) general speed (4) latch speed (5) advanced variable backcheck

Delayed Action – Optional
The D-4550DA / D-4551DA Series Door Closers are equipped with a separate hydraulic valve adjustment to delay the closing speed from 180 to 70 degrees of door opening range. To order add suffix DA to closer number.

Adjustable Spring Power
The D-4550/D-4551 Series Door Closers are designed to have the widest range of spring power adjustment available to meet the broadest range of application requirements.

Advanced Variable Backcheck (AVB) optional
Cylinder starts backcheck at approximately 45º instead of the normal 75º. Add suffix "AVB" to selected cylinder. When combined with Delayed Action consult factory for special template. (Heavy Duty Arm applications).

All Season Fluid
All season fluid eliminates the need for seasonal adjustment

Closing Power Adjustment
D-4550* – Size 2 – 6 with 50% spring power adjustment over size 6.
* Meets ADA 5lb opening force requirements on all applications except Pull-Side Regular Arm Mount.

The D-4550 Series is adjusted to size 3 before leaving the factory.

D-4551** – Size 1 – 5 with 35% spring power adjustment over size 5.
** Meets ADA 5lb opening force requirements.

The D-4551 Series is adjusted to size 2 before leaving the factory.

Delayed Action
A delayed action feature is available with this series for all applications and arms. The feature permits the door to close very slowly through the delayed action cycle range.

Forged Arms
Heavy duty forged arms are interchangeable between the D-4550 and D-3550 Series Door Closers.

High Impact Cover
All D-4550 / D-4551 Series Door Closers are shipped with a high impact self-extinguishing decorative cover.

Latching Power Adjustment
The D-4550 / D-4551 Series Door Closers have the provision to adjust the leverage of the arms by changing the pivot position of the arm in the shoe. The shoe itself does not have to be removed from the door or jamb.

Maintenance Free
Door Closers mounted in accordance with the provided installation instructions are maintenance free from periodic inspection and adjustment.

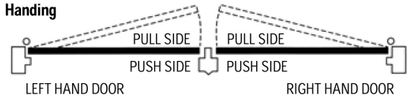
Metal Cover - Optional
Optional stainless steel, brushed finish metal cover is available

Non-Handed
Can be used on both RH and LH doors for both push side and pull side mounting.

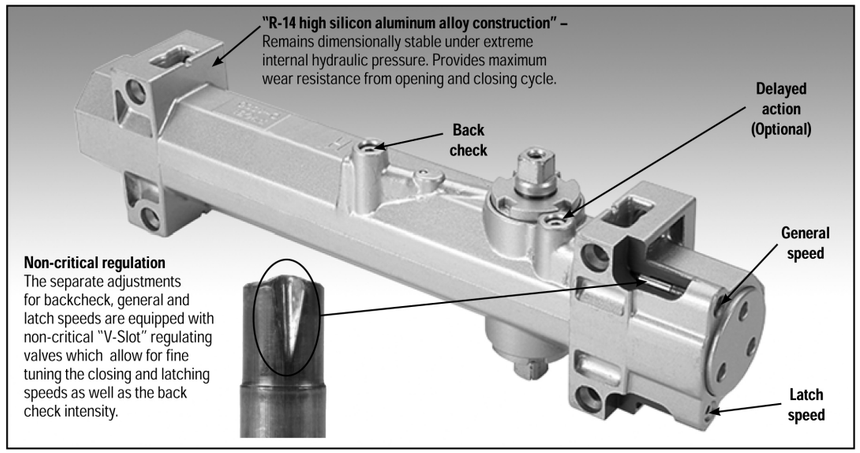
Special High Silicon Aluminum Alloy Housing
All D-4550 / D-4551 Series Door Closers are constructed of "STANLEY'S" R14 HIGH SILICON ALUMINUM ALLOY to exceed the ANSI/BHMA A156.4 Grade 1 requirements.

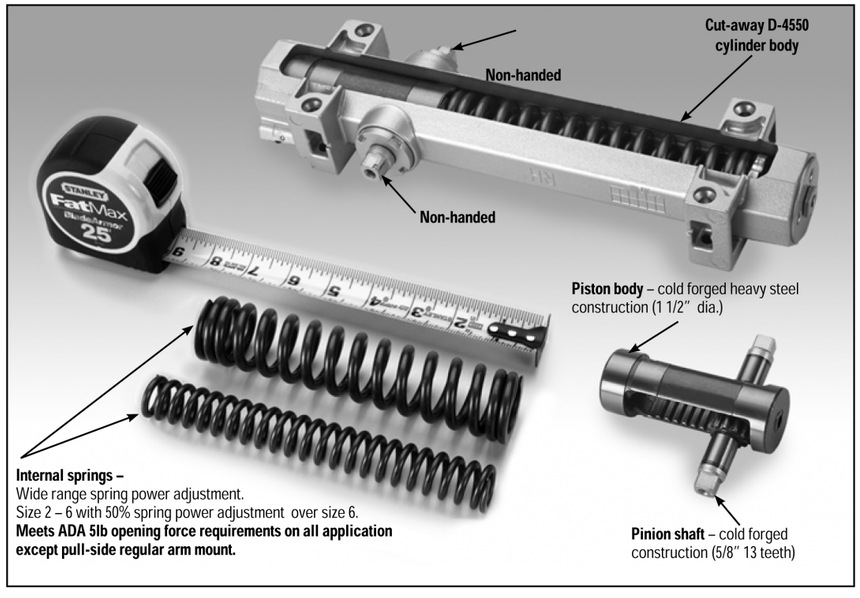
Special Rust Inhibitor (SRI) - Optional
For installations where a higher level of corrosive resistance is required.

Handing



Non-handed feature is available in a variety of finishes wide range of spring power adjustment. Standard packaging with tri-pack: regular, top-jamb and parallel arm arrangement. Can be ordered with heavy duty arm assembly. ANSI/BHMA A156.4 Grade 1, U.L. listed U.S. & Canada. The cylinder body is made from R-14 die cast aluminum. This alloy provides wear resistance from contact with the piston during the opening and closing cycle. R-14 wear characteristics are similar to that of cast iron. In addition the R-14 aluminum alloy holds the cylinder body dimensionally stable under extreme internal hydraulic pressures.





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PH	Parallel Hold Open	6
EH	Electronic Hold Open	13, 14
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S	Heavy Duty Arm w/Stop	8
CS	Heavy Duty Arm w/Compression Stop	8
HS	Heavy Duty Arm w/Hold Open and Stop	8
HCS	Heavy Duty Arm w/Hold Open & Comp. Stop	8
T	Track Mount	10
HT	Track Mount w/Hold Open	10
TCS	Track Compression Stop	10

Packaging Information:
All D-4550 / D-4551 Series Door Closers with standard arm sets are packed for mounting on standard, parallel arm or top jamb applications. All closer assemblies are packed 4 per carton. Tracks for track mounted closers are packed separately.

Through Bolts and Sex Nuts:
When through bolting is ordered, factory will furnish sex nuts for use with the machine screws furnished with the closer. Nuts are sized to accommodate 1-3/8" or 1-3/4" thick doors. Mounting screw thread size 12/24.

Finishes:
689– Aluminum painted
690– Dark bronze painted
691– Light bronze painted
693– Black painted
695– Dark bronze painted
696– Satin brass painted

ANSI and U.L. Specifications:

The D-4550/D-4551 Series Door Closers have been Certified to the requirements of the ANSI/BHMA Standard A156.4 - 2000 Grade 1. Available in a variety of ANSI/BHMA finishes. The Stanley Door Closer electro-static finishes surpassed over 100 hours of salt spray exposure.

UL listed with Underwriters' Laboratories, Inc. and Underwriters' Laboratories of Canada for "Self Closing Doors Without Hold-Open Feature". (File number 7525R).

UL10C – UBC 7.2
D-4550/D-4550 closers have been tested and certified to meet the positive pressure criterion of UL10C & UBC 7.2 (1997)

HOW TO ORDER: D-4550/D-4551

D-455	0	DA	EDA	689	SN
Model. No.	**Size**	**Options**	**Arm Type**	**Finishes**	**Fasteners**
D-455	**0**– See Closing Power Adjustment page 2 **1**– See Closing Power Adjustment page 2	**AVB** – advanced variable backcheck (optional) **DA** – Delayed Action (optional) **MC** – Metal Cover (optional)	**L**– Long Rod Forearm (TJ only) **H** – Standard Hold Open **PH** – Parallel Hold Open **EDA** – Heavy Duty Arm **EH** – Electronic Hold Open **H-EDA** – Heavy Duty Arm w/Hold Open **S** – Heavy Duty Arm w/ Stop **CS** – Heavy Duty Arm w/Compression Stop **HS** – Heavy Duty Arm w/ Hold Open & Stop **HCS** – Heavy Duty Arm w/ Hold Open & Compression Stop **Std. Packaging** – See packaging above **T** – Track Mount **HT** – Track Mount w/ Hold Open **TCS** – Track Compression Stop	**689** **690** **691** **693** **695** **696**	**SN** – Sex Nuts & Bolts Wood & Machine Screws furnished standard **SEC** – Security Screws

D–4550 SERIES

STANLEY
Security Solutions

EXIT DEVICES

APEX 2000 SERIES

STANLEY phi

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Introduction

The Apex 2000 Series Touchbar Style Exit Device is highly regarded by architects and end-users alike. Many of the nation's largest healthcare and educational facilities prefer the Apex for it's aesthetic design and efficient engineering. All Apex 2000 Series Exit Devices are UL listed for panic and fire hardware and are certified to ANSI A156.3 Grade 1. Several models are also certified for hurricane resistant applications.

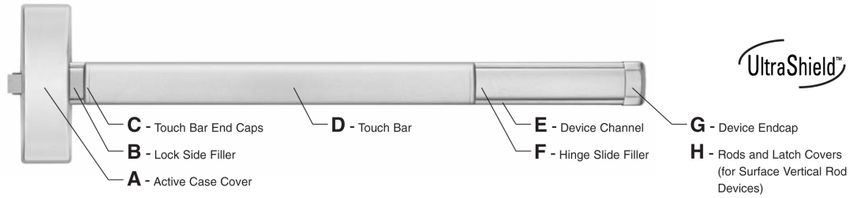
A complete offering of mechanical and electrical options provide a wide range of exit device security solutions. However, the traditional core strenghts of the product can't be overstated. Simple operation with few moving parts, manufactured with true ANSI/BHMA architectural finishes. The chassis is constructed from investment cast steel and the universal mounting holes provide an easier retrofit installation.

Quiet Operation

Sound Dampeners reduce the noise associated with Exit Device operation on the depression and return stroke of the Touchpad.

Touchbar Clearance

The Apex Wide Stile Series Exit Devices accommodate doors with vision lites or glass windows where the vision lite frames or moldings project up to 1/4 beyond the face of the door. The Active Case and End Cap Mounting Bracket are mounted on the face of the door without shims or without cutting the glass molding. These devices have a 1/4″ gap between the face of the door and the Touchbar Assembly. This gap allows proper functioning of the devices even on doors which are not perfectly flat. Since the Active Case is mounted directly on the face of the door, it accommodates standard lengths of through bolting screws, thumbpieces, knob & lever Trim fingers, and cylinder tail pieces.



Base Materials

Finishes	ANSI/BHMA	US	Aluminum	Brass	Bronze	Stainless Steel
Polished Brass, Clear Coated	605	US3	—	A,B,C,D,E,F,G,H	—	—
Satin Brass, Clear Coated	606	US4	—	A,B,C,D,E,F,G,H	—	—
Satin Bronze, Clear Coated	612	US10	—	—	A,B,C,D,E,F,G,H	—
Dark Oxidized Satin Bronze	613	US10B	—	—	A,B,C,D,E,F,G,H	—
Satin Aluminum, Clear Anodized	628	US28	A,E,F	—	—	B,C,D,G,H
Satin Stainless Steel	630	US32D	—	—	—	A,B,C,D,E,F,G,H

Finishes

ANSI/BHMA	US	Description
605	US3	Polished Brass, Clear Coated
606	US4	Satin Brass, Clear Coated
612	US10	Satin Bronze, Clear Coated
613	US10B	Dark Oxidized Satin Bronze
625	US26	Polished Chromium Plated
628	US28	Satin Aluminum, Clear Anodized
630	US32D	Satin Stainless Steel

Antimicrobial finishes

626AM		Satin Chrome Plated with UltraShield™ Antimicrobial coating
630AM		Satin Stainless Steel with UltraShield™ Antimicrobial coating

Mullion finishes

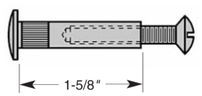
600	USP	Primed for Paint
689		Aluminum Paint
695		Dark Bronze Paint

Fasteners

Furnished standard with machine screws and full thread wood/sheet metal screws. Specify Sex Nuts and Bolts (SNB) where recommended or required by the door manufacturer.

Sex Nuts & Bolts (not furnished std.)

Sex Nuts & Bolts are furnished with No. 10-24 x 1″ OHMS (1-1/2″ long screws required for guides).



Security Screws

All exposed screws will be a Torx pin in tamper resistant type, machine screws only. Specify (SEC) Security Screws. Cover Screws use a T20 driver, End Cap Screws use a T25 driver.

Door Sizes

Stock sizes for door widths and heights are listed below. If required, cut to size in the field.

Door Widths	Stock Sizes
2′-0″ to 2′-6″	2′-6″*
2′-7″ to 3′-0″	3′-0″
3′-1″ to 4′-0″	4′-0″

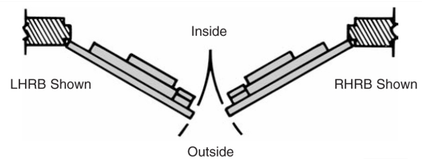
* Not available for Narrow Stile Devices.

Vertical Rod Devices

Device	Door Heights	Stock Sizes
Surface Vertical Rod Device*	up to 7′-0″	7′-0″
	7′-1″ to 8′-0″	8′-0″
	8′-1″ to 10′-0″	10′-0″
Concealed Vertical Rod Device	6′-8″ to 8′-0″	8′-0″
	8′-1″ to 10′-0″	10′-0″

* Surface Vertical Rods are furnished of the same material as the device. Stainless steel rods are furnished for 625, 628 and 630 devices.

Hand of Doors



CYLINDER FUNCTIONS

Cylinder Dogging

Available for all Apex Series Devices except Fire Exit Hardware and Delayed Egress Devices.

Cylinder Dogging provides the ability to lock down the touch bar with a key cylinder so the door can be used in the push/pull mode. To order, specify suffix "CD" (e.g. 2103CD). Requires the use of a 1-1/4 mortise cylinder, not furnished standard. Specify when required.

Less Dogging

Available for all Apex Series Devices except Fire Exit

Cylinder Dogging Kit

To convert from hex key dogging to cylinder dogging in the field, a cylinder dogging kit is available. The kit consists of a channel filler, blocking ring, cylinder locator and lock nut. Requires the use of a 1-1/4" mortise cylinder, not furnished standard. Specify when required.

Note: The channel fillers are different lengths for narrow and wide stile devices. "NCDK" - Narrow Cylinder Dogging Kit.

To Order: specify CDK-3, NCDK-3 for up to 3-0 and CDK4, NCDK-4 for devices up to 4-0.

2110 Rim Device - *Handed*

2310 Mortise Device - *Handed*

Double Cylinder - *Handed*

("10" Function)

The Double Cylinder option is available on the Wide Stile Rim and Mortise Exit Devices. The inside key cylinder locks or unlocks the outside Trim and the outside key cylinder retracts the latchbolt. Specify Outside Trim with "08" function.

When only the inside key cylinder is required to lock or unlock the outside trim and no outside cylinder operation is necessary, specify outside trim with "14" function.

Cylinders - Not furnished standard.
Rim Devices - Two rim type required.
Mortise Devices - One rim type and one 1-1/4" long mortise type required.

Type	Device No.		Trim No.
Rim	2110, FL2110	x	4908A, V4908A, 4914A
Mortise	2310, FL2310	x	M4908A, VM4908A, M4914A

To Order: Specify Hand and Finish
(e.g. 2110 4908A RHRB 630)

Double Cylinder Kits - *Handed*

The kit is available to convert 2103, FL2103, 2303 and FL2303 devices to 2110, FL2110, 2310 and FL2310 in the field.

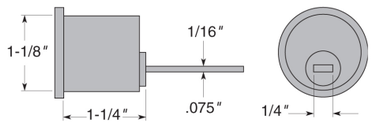
Rim Kit No. RDC10 - Includes locking assembly, cylinder assembly, cylinder collar and active case cover. Two rim type cylinders are required, not furnished standard.

Mortise Kit No. MDC10 - Includes M310 Mortise Lock, extension assembly, cylinder bracket, cylinder collar and active case cover. One rim type and one 1-1/4" long mortise type cylinder required, not furnished standard.

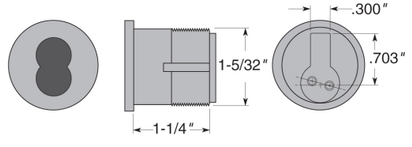
To Order: Specify Hand and Finish
(e.g. RDC10 RHRB 630)

Cylinders

Cylinders or interchangeable cores are not furnished with the device or trim. A BEST® cylinder housing and 7-pin core can be ordered separately. Specify type and finish when ordering. (e.g. 1E74 x 630)



Rim Cylinder - 1E72 x Finish



Mortise Cylinder - 1E74-C4 x Finish

DESIGN STANDARD for Doors and Door Frames

Purpose:

Doors are an important part in the user's experience, and are perhaps the most intimately experienced element of the built environment, because they are used daily to enter and exit the building and the rooms and spaces within. Doors should be inviting, easy to find, easy to use, durable and maintainable, add aesthetic value, and allow authorized entries while restricting unauthorized entries. The door design standards cited herein are intended to establish and maintain a minimum level of door quality in the educational and work facilities of SCCD buildings.

Note: these Design Standards are a tool to clarify direction and streamline project execution for design professionals, construction managers and other participants in capital improvement projects. Given the compatibility requirements with the Electronic Access Control System, **all doors and door frames selected by consultant must be reviewed by the Director of Facilities** and equivalent products (only where allowed) have to be approved as outlined in the ***Open this Document First: Standards Process.pdf***. In all cases the written design standards do not diminish or eliminate the standard of care owed by the consultant to SCCD or relieve, in any manner whatsoever, a consultant from any professional responsibility, duty or due diligence required toward that work.

Design Standard:

A. Exterior Doors and Frames (For Main Entry):

Given the windy conditions on all District Sites, which create challenges for the disabled community access, the District Standard for Exterior Doors is as follows:

1) Preferred Choice for Main Entrance to Buildings: Automatic Sliding Doors.

- These Doors shall have the following features:
  - Continually monitor door position with microprocessor controller.
  - Provide smooth, trouble-free operation with long-lasting load-bearing wheels.
  - Prevent slippage and uneven closing with anti-riser wheels.
  - Provide complete threshold protection at all times with self-contained sensors.
  - Emergency Breakaway Capability: power-operated automatic sliding doors may be used as emergency egress doors because they "break-out" in the direction of egress.
  - Glazing: Standard 1/4" tempered to match Glazing in **Design Standard for Glazing**.
  - Door & Frame Finish to match Exterior Aluminum Entrance in item B that follows.
  - Access Control Locking with recessed panic hardware: coordinate stile width to accept EACS (Electronic Access Control System), see **Design Standard for Electronic Safety and Security**. Door hardware must be compatible with EACS.
  - Battery Back-Up.

- Control Switch: Auto-Close-Open.
- Product: Stanley Access Technologies *Dura-Glide 2000/3000*. No substitutions allowed.

2) Alternate Choice for Main Entrance to Buildings: Aluminum Entrance Doors per item B below.

- Provide hardware as identified in **Design Standard for Door Hardware, item A2**.

B. Exterior Doors and Frames (All other Entries and Public Access Spaces):

- Aluminum Entrances such as *Kawneer 350* Heavy Wall Entrance, *Vistawall 375* or equivalent.
- Aluminum Storefront such as *Kawneer Trifab®400* or equivalent.
- Entrance, Frame and Storefront Finish:
  - Fairfield: *Kawneer Finish No. 40 Dark Bronze Anodized Aluminum*, Aluminum Association Specification # AA-M10C22A44.
  - Vallejo and Vacaville Centers: *Kawneer Finish No. 14 Clear Anodized Aluminum*, Aluminum Association Specification # AA-M10C22A41.
- Coordinate Stile Width with door hardware, see Electronic Access Control System in **Design Standard on Electronic Security and Safety** and **Design Standard on Door Hardware**.
- Glazing per **Design Standard on Glazing**.

C. Exterior Doors and Frames (All others):

- Shall be Aluminum Entrance if they occur in Aluminum Storefront. For finish, see item B above. For Glazing see **Design Standard on Glazing**.
- Shall be Hollow Metal Doors and Frames all other instances:
  - Insulated Exterior Flush Doors: ANSI 250.8, Level 4 Maximum Duty, Model 2 Seamless Construction, 14 gauge thick galvanized metal. Reinforce door lock edge with one-piece full height 14 ga channel; reinforce hinge edge with one-piece full height 12 ga channel.
  - Exterior Door Frames: full profile welded, ANSI 250.8, Level 4 Maximum Duty , 12 gauge thick material, 2-inch core with 1 ½" flashing fin.
  - Hollow Metal Door and Frame Finish:
    - Paint grade hollow metal doors and frames shall be painted the same color as the surrounding wall finish, to allow the doors to visually "disappear" to reinforce that the doors are not for public access.
    - Exceptions: if appropriate to Exterior Color Scheme hollow metal door frames should be painted to match finish identified in item B above (Entrance, Frame and Storefront Finish), and hollow metal doors should be painted per Exterior Color Scheme.
  - Suggested Manufacturers: Amweld, Curries or equivalent.

D. Interior Doors (Public Spaces):

- Stained wood veneer solid core doors are to be used for all public space types, such as classrooms, offices, labs, meeting rooms, break rooms, restrooms, and corridor separation doors.
  - Flush Interior Doors: 1-3/4 inches thick; WI Premium Grade; solid core; 5 ply construction; "A" grade veneer per ANSI/WDMA I.S.1A, White Birch, Plain-Sliced.
    - Preferred Finish Option
      Basis of Design: Marshfield DoorSystems® Signature Series Wood Veneer Doors, White Birch, Plain-Sliced, Honey 26-95 Finish with Enviroclad UV™
    - Alternate Finish Option subject to approval by District
      Basis of Design: Marshfield DoorSystems® Signature Series Wood Veneer Doors, White Birch, Plain-Sliced, Wine 38-95 with Enviroclad UV™
  - Materials subject to compliance with LEED Green Building Rating System Credit Requirements.
  - Suggested Manufacturers: Marshfield Door Systems; Algoma Hardwoods inc or equivalent.
- Exceptions: if appropriate to design and use, public space doors can be glazed aluminum storefront doors. Finish: Clear Anodized Aluminum.

E. Interior Doors (Non-Public Spaces):

- Painted hollow metal doors are to be used for non-public type spaces, such as utility rooms, maintenance shops, warehouses, and theatrical back-of-house areas such as oversized scene shop doors.
- Hollow Metal Flush Doors shall be:
  - Steel Sheet material in accordance to ANSI A250.
  - ANSI 250.8, Level 3 Extra Heavy Duty, Model 2 Seamless Construction
  - 14 gauge thick metal.
  - Reinforce door lock edge with one-piece full height 14 ga channel; reinforce hinge edge with one-piece full height 12 ga channel.
  - Paint grade doors shall be painted the same color as the surrounding wall finish, to allow the doors to visually "disappear" to reinforce that the doors are not for public access.
- Suggested Manufacturers: Amweld, Curries or equivalent.

F. Interior Door Frames:

- Shall be (Hollow Metal) Steel Sheet material in accordance to ANSI A250:
  - Full profile welded, ANSI 250.8, Level 4 Maximum Duty , 12 gauge thick material, 2-inch core with 1 ½" flashing fin.
  - Frame Finish:
    - At Public Space Types: paint grade hollow metal frames shall be painted to visually match the Clear Anodized Aluminum.
    - At Non-Public Space Types: paint grade hollow metal frames shall be painted the same color as the surrounding wall finish, to allow the frames to visually "disappear" to reinforce that the doors are not for public access.

- Suggested Manufacturers: Amweld, Curries or equivalent.

Approved Manufacturers:

As noted in this Standard.

Substitutes Allowed:

Not Applicable.

Associated Design Standards and Construction Specifications

Design Standard on Electronic Safety and Security Standards.
Design Standard on Doors Hardware.
Design Standard on Glazing.

End of Document

DESIGN STANDARD for Elevators

Purpose:

When required elevators are a critical component in the building. They provide access to the disabled community, transport supplies and equipment vertically through a building, and provide convenience to the general public. Given tight maintenance budgets, new and renovated elevators must achieve reliable performance and ride quality, as well as the level of aesthetic quality, operability and maintainability suggested by this design standard.

Note: these Design Standards are a tool to clarify direction and streamline project execution for design professionals, construction managers and other participants in capital improvement projects. They represent the District's "strong preference" and should be applied, when possible, without compromising the creativity of the overall design. Final disposition, color, size, product choice etc. should conform to the best extent possible where equivalent substitutes are allowed in the Design Standard. If equivalent substitutes are allowed only "if performance and quality equivalency can be evidenced" or the consultant wishes to deviate from the written design standards for other reasons, then the consultant needs to provide evidence/justification and seek District approval as outlined in the ***Open this Document First: Standards Process.pdf***. In all cases the written design standards do not diminish or eliminate the standard of care owed by the consultant to SCCD or relieve, in any manner whatsoever, a consultant from any professional responsibility, duty or due diligence required toward that work.

Design Standard:

1. **Elevator Installer and Maintenance Qualifications**

Installer must be a licensed Elevator Contractor in the State of California and must:

- Show evidence of successful experience in complete installation and maintenance of proposed manufacturer's elevator equipment.
- Directly employ sufficient competent personnel within 50 miles of Fairfield, California to handle both construction and maintenance duties.
- Maintain local stock of parts adequate for replacement on permanent or emergency basis.
- Respond to trouble calls within one hour.

2. **Elevator Types and Stops**

- Given the height of buildings proposed (two to three stories) and the existing precedent on campus, hydraulic elevators are the preferred elevator type at SCCD.

- Provide at least one elevator that serves all floors, including Basement (where it exists) and Roof Level.

3. Controllers

- Elevators shall use standard, non-proprietary controllers. This allows SCCD to have many choices of service providers, rather than being locked into one sole source provider. Acceptable controllers include MotionControl Engineering, or an equivalent controller that can be easily and economically serviced by an elevator service company other than the installing company.
- All diagnostic tools and equipment required for adjusting and troubleshooting shall be an integral / "on-board" feature of the microprocessor controller, and shall not require recharging, reprogramming or be of the automatic destruct type.

4. **Battery Emergency Operation**

Battery back-up is required to prevent entrapment during power outages. In the event of a power outage, the battery power lowers the elevator to the main exit floor and the doors open to allow anyone who would otherwise be entrapped to exit safely.

Battery backup should operate as follows:

- Provide a battery driven unit that will initiate operation of the protective circuits in case of a power failure.
- Arrange circuitry so that, if the mainline switch is open when the power transfer takes place, the elevator will not respond to the operation of the protective circuit.
- In case of normal power failure, arrange the elevator system to lower from a battery emergency supply. The emergency power supply shall consist of battery and battery chargers.
- Upon the failure of normal power, lower the elevator to the main exit floor. Upon arrival at the main exit landing, the elevator doors shall open automatically and remain open until regular door time has expired. The elevator shall then become inactivated.
- Automatically resume normal operation on restoration of normal power supply to the building.

5. Double-Bottom Cylinders with Sealed PVC Casings

To enhance passenger safety and reduce the risk of environmental contamination, SCCD requires new hydraulic elevators to have a double-bottom cylinder (in order to control the descending speed of the car as the hydraulic oil passes through a relief orifice should the bottom plate fail). SCCD also requires new hydraulic elevators to have a sealed PVC casing (to surround the entire cylinder and provide additional protection to the double-bottom cylinder investment and against environmental contamination).

6. Performance, Operating Qualities, Vibration Control and Sound Control

Performance:

- Contract Speed: Maximum ten percent (10%) speed variation under any loading condition in either direction.
- Hydraulic Pressure: Hydraulic components shall be factory tested for 600 PSI. Maximum operating pressure shall be 425 PSI.
- Door Open Times: 2.3 - 2.5 Seconds.
- Door Close Times: 3.0 Seconds or minimum without exceeding kinetic energy and closing force allowed by code.
- Door Dwell Times: Separate adjustable timers with initial settings at 5.0 seconds for both car and hall calls. Door dwell times shall be canceled by registration of car calls or by pressing the "door close" button.
- Leveling: Within three-eighths (3/8) inch under any loading condition.
  - Level into floor at all times, do not overrun floor and level back.

Operating Qualities:

- Transition: Starting and stopping shall be smooth and comfortable.
- Slowdown, stopping and leveling shall be without jars or bumps.
- Full Speed: Riding shall be free from vibration and sway.

Vibration Control:

- Specify effective sound isolation materials to isolate pumping plant from building structure to prevent objectionable noise and vibration transmission to occupied building spaces.

Sound Control:

- Maximum acoustical output level shall not exceed:
  - 80 dBA measured 3 feet from any piece of equipment in machine room.
  - 50 dBA measured in center of elevator cars and 5 feet above the cab floor during all sequences of operation.
  - 45 dBA measured in elevator lobbies 10 feet from the elevator doors.

7. Finishes

SCCD's preferred finishes include:

- No. 4 Satin Stainless Steel for interior doors, exterior doors, and for door jambs.
- Interior cab walls wear best with textured, rigidized stainless steel, with its increased impact resistance, graffiti resistance, and reflection control that hides scratches and

eliminates oil-canning. Rigidized Metals Corporation's 5.WL is an acceptable textured stainless steel; equivalent textured stainless steel (e.g., 6.WL, 1.NA, 2.WL, 1.CS, and 1.HM) are also acceptable.

- Designers should plan on replacing existing cab finishes that do not conform to these design standards, except in the case of freight-only elevators.
- Stainless Steel grab bars, no aluminum or brass.
- The sill shall be extruded aluminum, recessed to allow for finished floor.
- The finished flooring shall be the same resilient flooring as adjacent spaces.

8. Signage

- Permit holder shall be displayed within the elevator.
- The hallway signage warning occupants to use the stairway for exit in case of fire should be combined with the hall call button, in one brushed metal plaquard.

9. Key Switches

Key switches shall be keyed to the College's master key system. This requirement ensures that operating personnel do not have to carry or duplicate additional keys, and emergency response personnel (particularly fire responders) have the appropriate keys. Each function and/or lock shall be keyed alike.

Coordinate the design of the elevator controls key switches with the work of the security system designer and hardware specifier. Note that the appropriately pinned cylinders will be provided to the elevator contractor for installation.

10. Ceilings and Lighting

SCCD goal for elevator lighting includes an evenly and adequately lit cab using energy efficient lamps with long service lives. To that end, designers should specify any of the following lighting options:

- Suspended opaque acrylic ceiling grills, acting as lighting diffusers to the fluorescent strip lights above that include electronic ballasts and four foot T8 lamps
- Suspended silver parabolic lenses, acting as lighting diffusers to the fluorescent strip lights above that include electronic ballasts and four foot T8 lamps
- No. 4 Stainless steel panels with recessed, fluorescent down cans

Emergency Lighting:

- Specify a battery driven and self-recharging emergency car lighting unit, mounted on top of car, with sufficient capacity to operate emergency lights in continuous operation for four hours and the alarm bell for one hour.
- Within 5 seconds of loss of normal power activate two lamps as part of normal cab lighting. Surface mounted lights are not acceptable.
- Specify a test button in service cabinet.

11. Telephone

Specify a complete system consisting of a telephone and automatic dialer and push button to activate system. The telephone shall not be on the District's VOIP internal communications system, because category 6 cabling has a bending radius constraint inconsistent with the requirements of the elevator shaft; specify a POTS line. Mount behind a pattern of holes as an integral part of car operating panel. The automatic dialer shall be programmed to call the elevator contractor's telephone monitoring service (see Section 14 Warranty and Service, below).

12. Card Readers

Elevators with exterior access shall be tied to the College's Electronic Access Control System (EACS), for after-hours access. See **Design Standard for Electronic Safety and Security**. The EACS shall also be used if floors or areas of the building are to be isolated from each other during or after hours.

Coordinate the design of the elevator controls with the work of the security system designer. Specify that the elevator contractor is to include required wiring from the cab and elevator lobbies to the machine room, and that the final connections of the card readers shall be made by the security system integrator.

13. Protective Pads

Each cab must have its own set of pads provided in a heavy duty duffle bag with handles. This requirement ensures that each cab can be protected even during concurrent furniture/fixture/occupant moving operations, that maintenance personnel can handily carry the pads from the storage location to the cab for ease of installation, and that the pads are protected during periods of storage.

- Pads shall cover all walls with cutout sections for car operating panels.
- Specify heavy duty stainless steel buttons attached to cab panels for hanging.

14. Permits

- Specify that contractor is responsible for arranging and paying for inspections by governing authorities and obtaining operating permits.
- The operating permit shall list as the owner: Solano Community College District, 4000 Suisun Valley Road, Fairfield, CA 94534.

15. Warranty and Service

The elevator contractor shall warrant the new or renovated elevator for a period of 12 months following substantial completion of the general contractor's contract. Under no circumstances shall the elevator warranty period commence prior to the governing authority issuing an operating permit for the elevator.

SCCD typically uses one elevator service company to perform all its elevator service on existing elevators, including telephone monitoring service, monthly preventive maintenance service, callback repairs, entrapment rescues and 5-year load testing. However, we require new or renovated elevators to be fully serviced for the first 12 month period by the same elevator contractor who installed and is warranting the unit, and this requirement should be specified in the construction specifications.

Specify the following activities and criteria to be included as part of this requirement:

- Prior to commencing the 12 month maintenance service period, execute a standard elevator maintenance service agreement with the Solano Community College District, through the office of the Director of Facilities.
- Provide complete monthly maintenance on entire elevator system for a period of 12 months. This shall minimally include:
  - Examination: Include systematic examination with monthly adjustment and lubrication of elevator equipment. Whenever required provide replacement of defective parts with parts of same manufacture as required for proper operation. Contractor is not responsible for repairs to car enclosures, door panels, frames, sills or platform flooring resulting from normal usage or misuse, accidents and negligence.
  - Testing: Include any testing required by Code authorities including monthly testing of Firefighters' Service.
  - Performance Standards: Maintain smooth starting, stopping, ride qualities and accurate leveling at all times.
  - Call-Backs: Provide 24 hour emergency call-back service at no additional cost to Owner. Emergency call-back includes trapped passengers and incidents where serious equipment or building damage may occur. Respond to trouble calls within one hour.
  - Telephone Monitoring: The automatic dialer shall be programmed to call the elevator contractor's telephone monitoring service. Coordinate through the District's Office of the Vice Chancellor of Facilities for the College's callback notification protocol.
- Final Service and Inspection: Two weeks before expiration of the year's maintenance, the equipment shall be lubricated, fully serviced, adjusted to the standards designated and emergency service operation devices shall be checked. A representative of the District will make a complete inspection.
- Elevator Shutdowns:
  - Should the elevator become inoperative, repair or replace minor components within 24 hours of notification of failure and return to service. Complete service and repairs of major components within 72 hours.
  - The District may order the work done by other contractors at the Contractor's expense for failure to comply with the requirements noted above.
  - Extend maintenance and responsibility for correct operation to devices repaired or replaced by others under these circumstances.
- Follow-Up Tests: Test all safety devices and emergency operations at 6 month intervals or sooner and submit written report on each test. Perform tests at times that do not interfere with College operations.
- Maintenance Tool and Software Manuals: Provide maintenance tools, supporting software, instruction manuals and all documentation required for maintenance of the entire system including trouble shooting, diagnostics and adjusting. All diagnostic tools and equipment required for adjusting and troubleshooting shall be an integral / "on-board" feature of the microprocessor controller, and shall not require recharging, reprogramming or be of the automatic destruct type.
- Maintenance Materials: The elevator service contractor shall provide a metal cabinet in the machine room containing a reasonable supply of expendable parts required for prompt replacement. Replenish parts used for routine maintenance to ensure an adequate supply is available. Cabinet and all contents shall become property of SCCD and shall not be removed upon expiration of maintenance period.

Approved Manufacturers:

o Elevator Manufacturers

- ThyssenKrupp Elevator Corp.
- Schindler Elevator Co.
- Otis Elevator Co.

o Microprocessor Controllers

- MotionControl Engineering
- Or equivalent nonproprietary

o Cab and Entrance Manufacturers

- Elevator manufacturer
- Tyler Elevator Products
- H & B Elevators
- Sterling Corporation
- Swiss Dane

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Construction Specifications

Design Standard on Building, Floor, Room, Stair, Elevator, Equipment and Outlets Designation.
Design Standard on Electronic Safety and Security.

End of Document

DESIGN STANDARD for Emergency Response Related

Purpose:

The purpose of this design standard is to help ensure that emergency response vehicles and personnel have quick, clear, and easy access to all areas of any District campus in the event of an emergency.

SCCD is committed to working with local agencies to insure that safety standards and access for emergency vehicles and other devices as discussed in the District's "PACEP" Safety Committee will meet best practices of the industry.

Design Standard:

Fire department service areas

Fairfield Campus is served primarily by the Cordilia Fire Department.
Vacaville Campus is served primarily by City of Vacaville Fire Department.
Vallejo Campus is served primarily by City of Vallejo Fire Department.

General Site Access

- It is important that emergency vehicles have driving access close to all campus buildings, central campus areas and exterior plaza areas; a good goal is to provide EVA access to within 150 feet of all exterior portions of each building.
- Provide a minimum 20-foot width on all Emergency Vehicle Access (EVA) lanes, to allow adequate space for two emergency vehicles to pass each other going in opposite directions. Where this cannot be provided for the entire length of the EVA lanes (due to existing structural or landscape feature), a passing lane or other accommodation will be reviewed by SCCD and the appropriate emergency response agencies.
- The EVA lanes must have a minimum 13‟ canopy clearance for emergency response vehicles.
- Paving for EVA lanes must be capable of supporting fire trucks (60,000 pound minimum loading requirement, subject to review and acceptance by the respective emergency response agencies).
- Ideally EVA lanes should be "looped" to allow alternate means to access central and critical areas of the campus. Where this cannot be provided, hammer-head turnarounds will be required (subject to the acceptance of the respective emergency response agencies).
- Fire trucks require a 52' outside diameter turning circle, if this is not feasible, confirm with the fire department if they will accept a 3-point turning configuration.

Knox Boxes and Padlocks

- The fire department prefers that Knox boxes are placed throughout the campus, for easy and multiple key set access.
- SCCD has standardized on Knox-Box 3200 Series for fire department key storage.

- Install recessed Knox boxes at each major entrance in new construction.
- Install recessed Knox boxes at each major entrance in renovation projects, if feasible; otherwise install surface-mounted units.
- Install Knox padlocks on gates; these can be daisy-chained with standard padlocks for college use.

Fire Sprinkers

- See **Design Standard for Basic Fire Protection System Design**.
- All new construction shall be fully sprinklered.
- Major renovation of an existing building should include retrofit sprinklering of the building.
- Minor renovation of an existing building should include standpipes installed outside the buildings so that fire fighters have a water source for their hoses.

Standpipes

- Install standpipes in stairwells in new construction. The local fire departments prefer that the standpipes are at the main floors, not at intermediate landings. Include the ground/first floor landing, even if not required by code.

Fire Alarm Systems

- See **Design Standard for Fire Alarm Systems**.

Approved Manufacturers:

Knox-Box 3200 Series
Others per referenced Design Standards.

Substitutes Allowed:

Knox-Box substitution to be approved by Director of Facilities.
Others per referenced Design Standards.

Associated Design Standards and Construction Specifications

Design Standard for Basic Fire Protection System Design.
Design Standard for Fire Alarm Systems.

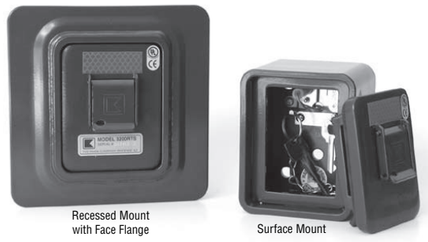
End of Document

Cutsheet Attachments:
Knox-Box 3200 Series

KNOX®
Serving Fire Departments Since 1975

Knox-Box® 3200 Series
LIFT-OFF DOOR MODEL

High Security Industrial/Government Key Box



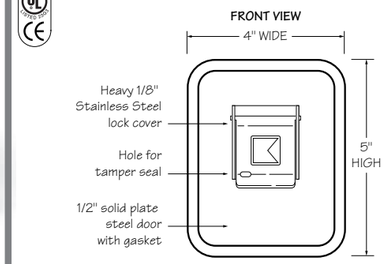
The number one high-security KNOX-BOX® is used for most commercial applications including businesses, schools, government and public buildings, community associations and apartment complexes. The 3200 Series KNOX-BOX with lift-off door holds keys, access cards and other small items necessary for emergency access.

Features and Benefits

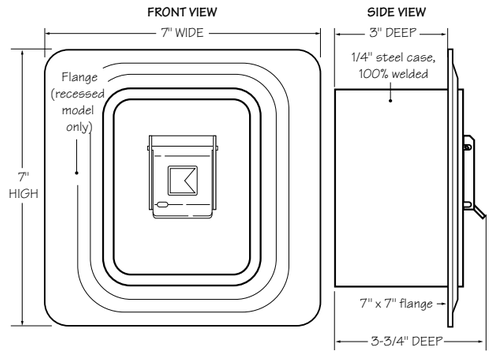
- Holds up to 10 keys and access cards in interior compartment
- Ensures high security. Box and lock are UL® Listed
- Includes a Knox-Coat® proprietary finishing process that protects Knox products up to four times better than standard powder coat
- Resists moist conditions with a weather resistant door gasket
- Colors: Black, Dark Bronze or Aluminum
  Weight: Surface mount - 8 lbs.
  Recessed mount - 9 lbs.

Options

- Alarm tamper switches (UL Listed)
- Recessed Mounting Kit (RMK) for recessed models only
- Inside switch for use on electrical doors, gates and other electrical equipment



3200 Surface Mount



3200 Recessed Mount

Ordering Specifications

To insure procurement and delivery of the 3200 Series KNOX-BOX, it is suggested that the following specification paragraph be used:

KNOX-BOX surface/recessed mount with lift-off door, with/without UL Listed tamper switches. 1/4" plate steel housing, 1/2" thick steel door with interior gasket seal. Box and lock UL Listed. Lock has 1/8" thick stainless steel dust cover with tamper seal mounting capability.

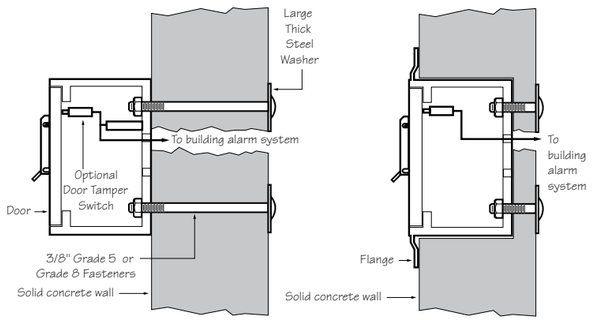
Exterior Dimensions:	Surface mount body - 5"H x 4"W x 3-3/4"D Recessed mount flange- 7"H x 7"W
Lock:	UL Listed. Double-action rotating tumblers and hardened steel pins accessed by a biased cut key.
Finish:	Knox-Coat® proprietary finishing process
Colors:	Black, Dark Bronze or Aluminum
P/N:	3200 Series KNOX-BOX (mfr's cat. ID)
Mfr's Name:	**KNOX COMPANY**

KNOX COMPANY • 1601 W. Deer Valley Road, Phoenix, AZ 85027 • (800) 552-5669 • (623) 687-2300 • Fax (623) 687-2299 • Web: www.knoxbox.com • E-mail: info@knoxbox.com

KNOX®
Serving Fire Departments Since 1975

Knox-Box® 3200 Series
LIFT-OFF DOOR MODEL - MOUNTING DIAGRAM

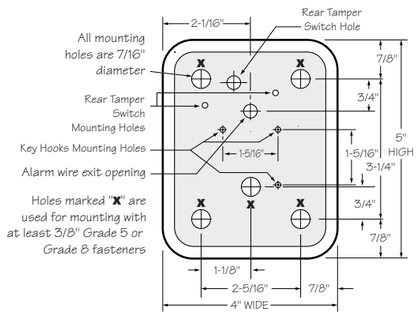
Suggested minimum mounting height
6 feet above ground



3200 Series Lift-off Door Surface Mount

3200 Series Lift-off Door Recessed Mount

Inside View



Attention: KNOX-BOX® is a very strong device that MUST be mounted properly to ensure maximum security and resist physical attack.

Knox® Rapid Entry System
The Knox Company manufacturers a complete line of high security products including Knox-Box key boxes, key vaults, cabinets, key switches, padlocks, locking FDC caps, plugs and electronic master key security systems. For more information or technical assistance, please call Customer Service at 1-800-552-5669.

Recessed Mounting Kit

The 3200 Recessed Mounting Kit (RMK) is used for recessed models only. It contains a shell housing and mounting hardware to be cast-in-place in new concrete or masonry construction. After construction is completed, the KNOX-BOX mounts inside the recessed shell housing. The RMK may only be used in new concrete or masonry construction.

Installation In Cast Concrete

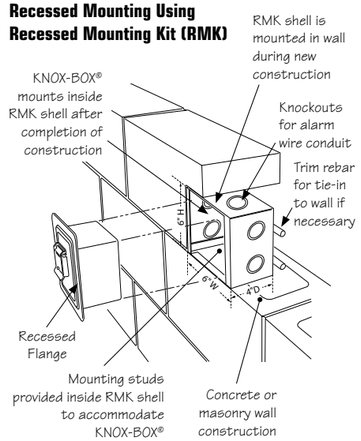
The optional Recessed Mounting Kit is for use in new concrete or masonry construction only. The kit includes a shell housing and mounting hardware to be cast-in-place. The KNOX-BOX is mounted into the shell housing after construction is completed.

Dimensions

Rough-in Dimensions: 6-1/2"H x 6-1/2"W x 5"D

IMPORTANT: Care should be taken to insure that the front of the RMK shell housing, including the cover plate and screw heads, is flush with the finish wall. The RMK must be plumbed to insure vertical alignment of the vault.

Recessed Mounting Using Recessed Mounting Kit (RMK)



KNOX COMPANY • 1601 W. Deer Valley Road, Phoenix, AZ 85027 • (800) 552-5669 • (623) 687-2300 • Fax (623) 687-2299 • Web: www.knoxbox.com • E-mail: info@knoxbox.com

MKT-KBSPEC-0020-C

DESIGN STANDARD for Exterior Paint

Purpose:

This design standard has the purpose of creating a consistent application of painting requirements throughout the Solano Community College District. The intent is to create a standard of quality for maintenance and reliability throughout all renovation and new building projects.

Note: these Design Standards are a tool to clarify direction and streamline project execution for design professionals, construction managers and other participants in capital improvement projects. They represent the District's "strong preference" and should be applied, when possible, without compromising the creativity of the overall design. Final disposition, color, size, product choice etc. should conform to the best extent possible where equivalent substitutes are allowed in the Design Standard. If equivalent substitutes are allowed only "if performance and quality equivalency can be evidenced" or the consultant wishes to deviate from the written design standards for other reasons, then the consultant needs to provide evidence/justification and seek District approval as outlined in the ***Open this Document First: Standards Process.pdf***. In all cases the written design standards do not diminish or eliminate the standard of care owed by the consultant to SCCD or relieve, in any manner whatsoever, a consultant from any professional responsibility, duty or due diligence required toward that work.

Design Standard:

1. Exterior Paint

- SCCD has standardized on latex (water based) paints for the outdoor environment for the following reasons:
  - Water-based paints are the safest option for the people who handle them and the environment.
  - Latex paints have a less objectionable odor, which makes them good for repaints and painting in occupied areas, where solvent odor is an issue.
  - They clean up with soap and water; there's no need to work with hazardous and/or flammable solvents, and no used solvent to dispose of afterwards.
  - Latex paints dry faster, and can be recoated sooner; this makes them a good choice for painting in occupied areas, where someone might touch or brush up against the freshly painted surface.
  - Latex paint binders hold up better in sun-exposed areas, because they're more resistant to UV (ultraviolet) radiation.
  - Latex paint films are less prone to yellowing over time, especially with white, light off-white and pastel colors.
  - Latex paint films are more breathable; they allow small amounts of water vapor to pass through the film, so the chance of blistering is reduced. This is especially important when the surface being painted is slightly damp.

C. Latex paint films have better gloss and color retention, so they'll keep a 'like-new' appearance longer.

2. Exterior Color Palette

- Each of the campuses has an exterior color palette that creates continuity across the District sites but also addresses each campus' uniqueness. See **Attachments** for Campus Color Palettes. Note Trespa Panel Colors have been used as a basis for some of the colors provided because in some instances buildings may introduce colors through building panel materials in lieu of paint, and there is a desire to match the quality of color saturation provided by these panels should they be introduced via painting.
  - All Campuses Field Colors:
    - Color similar to Kelly Moore Apple White, KM_OW206-1
    - Color similar to Sherwin Williams Eider White, SW 7014
    - Color similar to Trespa Stonebeige, A0511
  - All Campuses Exterior Columns:
    - Exposed Concrete, Sandblasted, Smooth Finish **or**
    - Color similar to Sherwin Williams Extra White, SW 7006
  - Accent Colors for Fairfield and Vacaville: the intent is for buildings to opt for only one to two accent colors out of these pair of choices:
    - Color similar to Trespa Pacific Board, NW04 or Trespa Sienna Brown, A10.4.5
    - Color similar to the range provided by Trespa Dark Mahogany, NW19
    - Color similar to Trespa Ocean Grey, A22.3.1 or Trespa Powder Blue, A22.2.4
    - Color similar to Trespa Sun Yellow, A05.1.4 or Trespa Gold Yellow, A04.1.7
    - Color similar to Trespa Spring Green, A37.2.3 or Trespa Forest Green, A34.8.1
    - Neverfade Solano Blue P – 6726, semi-gloss
  - Accent Colors for Vallejo: the intent is for buildings to opt for only one to two accent colors out of these pair of choices:
    - Color similar to Trespa Pacific Board, NW04 or Trespa Sienna Brown, A10.4.5
    - Color similar to the range provided by Trespa Dark Mahogany, NW19
    - Color similar to Trespa Ocean Grey, A22.3.1 or Trespa Steel Blue, A24.4.1
    - Neverfade Solano Blue P – 6726, semi-gloss
  - Non-Public/Utility Buildings on any campus have the option of being painted to match Trespa Mid Beige A08.2.1.
  - Exterior Mullions for Fairfield: *Kawneer Finish No. 40 Dark Bronze Anodized Aluminum*, Aluminum Association Specification # AA-M10C22A44. See **Design Standard on Doors and Door Frames**.
  - Exterior Glazing for Fairfield: to match *Viracon VE1-2M*, see **Design Standard on Glazing** for exceptions.
  - Exterior Mullions for Vallejo and Vacaville Centers: *Kawneer Finish No. 14 Clear Anodized Aluminum*, Aluminum Association Specification # AA-M10C22A41. See **Design Standard on Doors and Door Frames**.
  - Exterior Glazing for Vallejo and Vacaville Centers: to match *PPG Industries, Inc. Solargray with Solarban 60*, see **Design Standard on Glazing** for exceptions.

Approved Manufacturers:

Latex Paint: Sherwin Williams.

Substitutes Allowed:

No substitutions allowed.

Associated Design Standards and Construction Specifications:

Design Standard for Interior Paint

End of Document

Attachments:
Fairfield Exterior Color Palette, Vacaville Exterior Color Palette, Vallejo Exterior Color Palette

Fairfield Exterior Color Palette:

Sandblasted Concrete

Kelly Moore Apple White, KM_OW206-1

Sherwin Williams, Elder White, SW 714

Sherwin Williams Extra White SW7006

Trespa Stonebeige, A0511

Trespa Sienna Brown, A10.4.5

Trespa Light Mahogany, NW19

Trespa Pacific Board, NW04

Trespa Dark Mahogany, NW19

White Birch

Medium Grey

Anodized Clear Aluminum

Neverfade Solano Blue, P-6726

Kawneer 40 Dark Bronze Anodized Aluminum

Viracon VE1-2M Glazing

Trespa Ocean Grey, A22.3.1

Trespa Powder Blue, A22.2.4

Trespa Sun Yellow, A05.1.4

Trespa Gold Yellow A04.1.7

Trespa Spring Green, A37.2.3

Trespa Forest Green, A34.8.1

Trespa Mid Beige, A08.2.1

Trespa Natural Greige, A06.7.1

Vacaville Exterior Color Palette:


Sandblasted Concrete

Sherwin Williams Extra White SW7006

Kelly Moore Apple White, KM_OW206-1

Sherwin Williams, Elder White, SW 714

Trespa Stonebeige, A0511

Trespa Sienna Brown, A10.4.5

Trespa Pacific Board, NW04

White Birch

Trespa Light Mahogany, NW19

Trespa Dark Mahogany, NW19

Medium Grey

Anodized Clear Aluminum

Neverfade Solano Blue, P-6726

PPG Solargray with Solarban 60

Trespa Ocean Grey, A22.3.1

Trespa Powder Blue, A22.2.4

Trespa Sun Yellow, A05.1.4

Trespa Gold Yellow A04.1.7

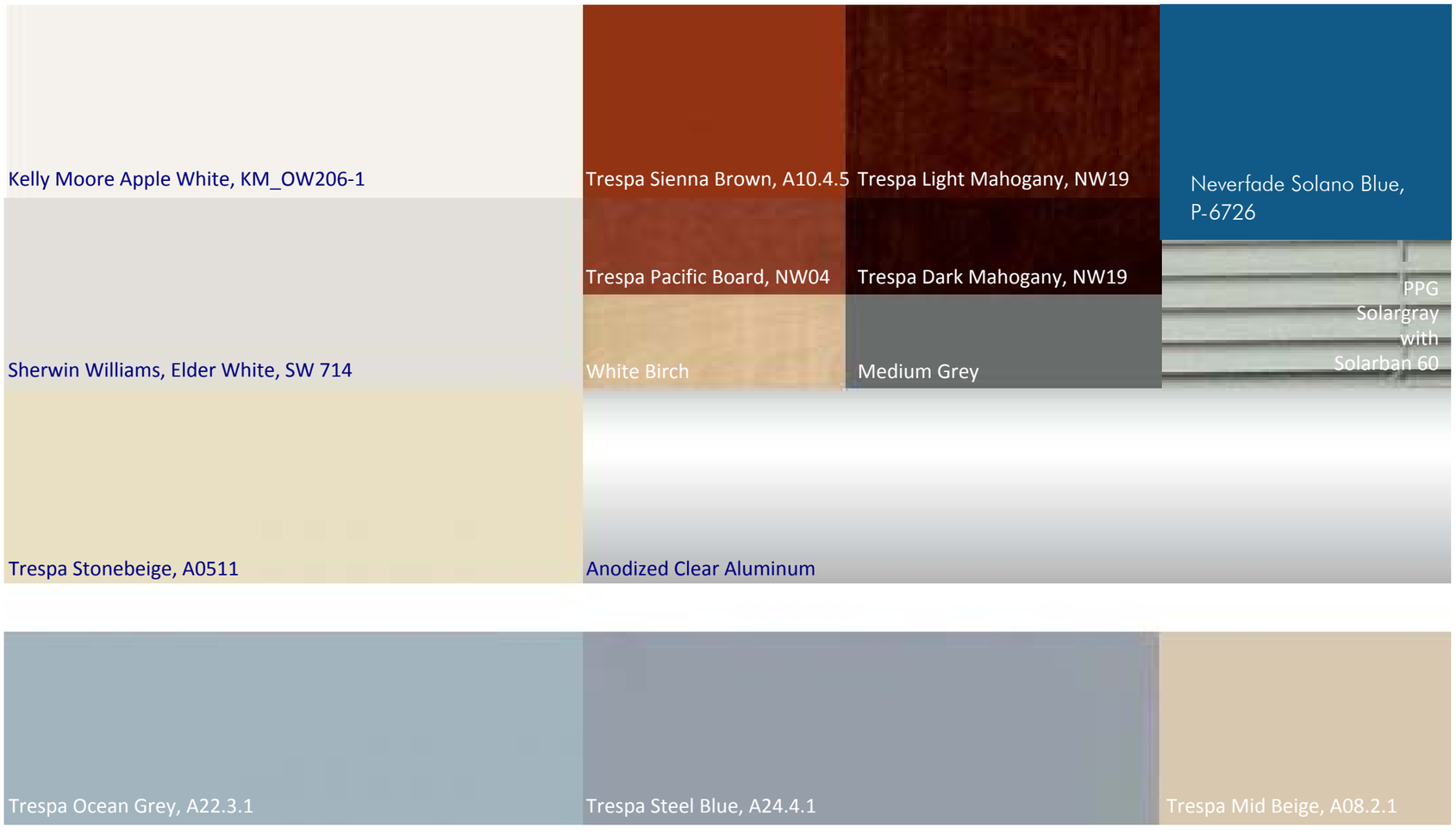
Trespa Spring Green, A37.2.3

Trespa Forest Green, A34.8.1

Trespa Mid Beige, A08.2.1

Trespa Natural Greige, A06.7.1

Vallejo Exterior Color Palette:



DESIGN STANDARD for Flagpoles

Purpose:

The purpose of this design standard is to ensure consistency in the provision of flagpoles at each campus, which are functionally appropriate to each college's environment.

Design Standard:

- Flagpoles shall be aluminum, unpainted.
- Flagpole heights shall be appropriate to the site.
- Flagpoles shall have a round gold finial at the top.
- Flagpoles shall have LED light fixtures at the base, for nighttime illumination. This ensures that the flags can be displayed at night, negating the need for staff to raise and lower the flags on a daily basis.
- Flags shall be weatherproof material, appropriate for 24/7/365 exposure.
- Comply with rules for use and display of the flag (36 United States Code 173-178)

Substitutes Allowed:

Not applicable.

Associated Design Standards and Construction Specifications

Not applicable.

End of Document

DESIGN STANDARD for Flooring

Purpose:

The purpose of this Standard is to standardize the Flooring for District sites based on the following criteria:

- Durability
- Ease of Maintenance
- Aesthetics
- Sustainability: products that reduce water and energy consumption, are sustainably produced, and assist with quality of indoor air.
- Acoustics
- Cost (initial and total cost)

Note: these Design Standards are a tool to clarify direction and streamline project execution for design professionals, construction managers and other participants in capital improvement projects. They represent the District's "strong preference" and should be applied, when possible, without compromising the creativity of the overall design. Final disposition, color, size, product choice etc. should conform to the best extent possible where equivalent substitutes are allowed in the Design Standard. If equivalent substitutes are allowed only "if performance and quality equivalency can be evidenced" or the consultant wishes to deviate from the written design standards for other reasons, then the consultant needs to provide evidence/justification and seek District approval as outlined in the ***Open this Document First: Standards Process.pdf***. In all cases the written design standards do not diminish or eliminate the standard of care owed by the consultant to SCCD or relieve, in any manner whatsoever, a consultant from any professional responsibility, duty or due diligence required toward that work.

Design Standard:

1. **Flooring Recommendations by Room Type:**

   See Table on the next page.

Flooring Recommendations by Room Type:

Room Use	1st Choice	2nd Choice	3rd Choice
Lobby/Entries	Stained Concrete with transparent sealer appropriate for use	Carpet with built-in Walk-Off Mat	
Door Entrance Area	Built-in Walk-Off Mat Do **not** specify Aluminum Grate Walkway		
Public Hallways/Corridors	Stained concrete with transparent sealer appropriate for use	Carpet	Linoleum
Classrooms	Carpet	Linoleum	Stained Concrete with transparent sealer appropriate for use
Laboratories/ Kitchen Areas	Stained Concrete sealed with transparent sealer specific to Laboratory use. No exception except where required by code.		
Offices and Office Areas	Carpet		
Restrooms	Ceramic Tile		
Study Areas, Lounges etc.	Carpet with linoleum at areas with sinks		
Service Areas and Service Hallways	Concrete with transparent sealer specific to use. No exceptions except where required by code	Vinyl Sheet Flooring with welded seams and integral coves where chemicals are a concern	
Custodial Spaces	Concrete with transparent sealer specific to maintenance use. No exceptions.	Concrete with transparent sealer specific to maintenance use	

2. Flooring Specifics:

A. Concrete with Transparent Sealer appropriate for specific use, Stained in Public Areas:
One sustainable approach to buildings is to use less building materials. In rooms and hallway/corridors where acoustics are less of a concern (or handled by other finish materials) the concrete used in the floor slab can be utilized as the floor finish, as long as it is sealed with a sealer appropriate for the room/space use. In public areas, the concrete should be stained to provide visual interest.
- With new buildings, design professionals should review concrete specification to ensure best staining results and review concrete joint locations to enhance the visual appearance of the floor.
- Sealers should address appropriate use (for example expected chemicals, moisture, cleanability performance) as well as code requirements for anti-slip etc.
- Example sealers are sealers from Rustoleum.
- Locations: see Table under item #1.

B. Linoleum Flooring:
Sheet Linoleum is an extremely durable product made of natural materials that are naturally anti-bacterial and biodegradable, yet very resistant to water, easy to clean, relatively low maintenance, aesthetically pleasing, and cost effective. Since it is easy to cut, it can be combined into different colors and patterns.
- The product does require experienced installers, and specifications should list criteria for ensuring adequate experience.
- Heat-Welded Seams.
- Specify Low Maintenance Coating (such as Armstrong NATURCote UV-cured coating).
- Product: Armstrong Commercial Flooring Linoleum.
- Locations: see Table under item #1.

C. Vinyl Sheet Flooring:
In certain laboratory classrooms, kitchen areas and service areas it might be necessary to specify vinyl sheet flooring with heat-welded seams and integral cove base due to the chemicals or activities in the room that require specialized clean up/containment. Vinyl Sheet Flooring is not a sustainable/green product and should not be used for any other application.
- Material: heavy-duty resilient sheet flooring.
- Thickness: 0.10”
- Locations: only at laboratories and service areas that warrant this flooring.
- Products: Armstrong Sheet Vinyl or Altro High Performance Safety Flooring.

D. Carpet:
SCCD selected the Tarkett Company, Tandus Carpets as the District Standard because of the ease of installation (and replacement by maintenance personnel), its environmental benefits (including cradle to grave, high recycled content, virtually zero VOCs), elegant aesthetics, use of no wet adhesives (avoids offgasses), static control and its affordability. Products are available both as rolled and modular tile, and logos can be cut into the carpet.
- Rolled Goods: 6’ or 12’ wide. Not preferred; avoid if possible.
- Modular Goods: 24” x 24”.
- Backing: Flex-Aire Cushion Modular
- Product: Tandus Carpets.
- Style: Choose from most popular styles (to ensure manufacturer continuity with providing that particular style), such as Aftermath II, Longitude, Monumento and Ratio.
- Non-directional pattern preferred.
- Peel and stick, or corner tabs.

E. Rubber Base:
Rubber is the preferred (sustainable) base material, that is also durable:
- 4" Topset rubber cove base.
- Long rolls to minimize seams.
- Minimize joints
- No joints in corners.
- Score corners.
- No pieces less than 24"
- Use full length sections around columns and appurtenances.
- Roll out base during installation.
- Product: BurkeMercer, Type TS.

F. Ceramic Tile:
As described in the **Design Standard for Restrooms:**
- Provide ceramic mosaic tile in minimum 6" x 6" size for restrooms.
- Provide ceramic tile in colors that camouflage dirt and stains.
- Number of colors not to exceed 5 different colors for restrooms, 1 for custodial.
- Provide a 12-inch wide darker color border on floor, in a color that has a matching cove tile base at restrooms only.
- Pattern within border can be random (makes for easier replacement), at restrooms only.
- Select grout color to minimize appearance of stains.
- Provide same colored grout for both floors and walls, this will allow installer to complete installation in a single installation, thereby reducing cost to District.
- Products: Dal Tile or American Olean.

3. Flooring Colors:

- Design Teams should provide District with at least (2) choices for Color Palettes that encompass all finish materials, including flooring finishes. District may opt to adopt a particular palette as a District Standard for that campus in the future.

Approved Manufacturers:

Per above.

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Construction Specifications

Design Standard for Restrooms
Design Standard for Custodial Spaces

DESIGN STANDARD for Glazing

Purpose:

The purpose of this Standard is to standardize the glazing on each District Site for the architectural cohesiveness of each campus, while ensuring that the visibility requirements, the energy performance requirements and the quality criteria are met.

The desire is to move away from the existing dark glazing on the Fairfield campus to a more visible glazing that allows inside activities to be showcased. A glazing with a "greenish" look is the *preferred* color due to its compatibility with the rest of the Fairfield exterior color palette for Fairfield (see Design Guidelines). For the Vallejo and Vacaville sites, the *preference* is to replicate the existing "greyish" look that already exists at the recently built Centers. District understands that glazing choices are affected by many considerations, including energy performance for the project, which is why deviations from the preferred colors will be considered on a project basis.

Note: these Design Standards are a tool to clarify direction and streamline project execution for design professionals, construction managers and other participants in capital improvement projects. They represent the District's "strong preference" and should be applied, when possible, without compromising the creativity of the overall design. Final disposition, color, size, product choice etc. should conform to the best extent possible where equivalent substitutes are allowed in the Design Standard. If equivalent substitutes are allowed only "if performance and quality equivalency can be evidenced" or the consultant wishes to deviate from the written design standards for other reasons, then the consultant needs to provide evidence/justification and seek District approval as outlined in the ***Open this Document First: Standards Process.pdf***. In all cases the written design standards do not diminish or eliminate the standard of care owed by the consultant to SCCD or relieve, in any manner whatsoever, a consultant from any professional responsibility, duty or due diligence required toward that work.

Design Standard:

1. Exterior Fairfield Campus:

- Tinted Low-E Glass Units: ASTM E774, Class A; double pane with dual silicone sealed edge; 1 inch overall thickness.
- Properties:
  - Visible Light Transmittance: 70 percent
  - Shading Coefficient: 0.44
  - Solar Heat Gain Coefficient: 0.38
  - U-Value: 0.29 Winter/0.26 Summer
  - Preferred Glass Color: per *Viracon VE1-2M*
- Product: *Viracon VE1-2M*.
- Silkscreens: permitted, review with District's Project Manager.

2. **Exterior Vacaville and Vallejo Campus:**

- Tinted Low-E Glass Units: ASTM E774, Class A; double pane with dual silicone sealed edge; 1 inch overall thickness.
- Properties:
  - Visible Light Transmittance: 35 percent
  - Shading Coefficient: 0.32
  - Solar Heat Gain Coefficient: 0.28
  - U-Value: 0.29 Winter/0.27 Summer
  - Preferred Glass Color: per *PPG Industries, Inc. Solargray with Solarban 60*
  - Silkscreens: permitted, review with District's Project Manager.
- Product: *PPG Industries, Inc. Solargray with Solarban 60.*
- Silkscreens: permitted, review with District's Project Manager.

3. **Interior Glazing (All Sites):**

- Clear, 1/4" tempered glazing, unless otherwise required by Fire-rated or Code conditions.
- Silkscreens: permitted and encouraged for interior conditions where some privacy is required, review selection with District's Project Manager.

Approved Manufacturers:

Per above.

Substitutes Allowed:

For Exterior Glazing: glazing color deviations will be considered on a project by project basis, regardless glazing must perform to these minimum requirements: visible transmittance is no lower than 35%, and energy performance criteria satisfies energy targets for particular project.

Associated Design Standards and Construction Specifications

Design Standard for Doors and Door Frames.

End of Document

DESIGN STANDARD for Interior Paint

Purpose:

The purpose of this design standard is to create a standard for the quality, maintenance, reliability, and indoor air quality of Interior Paint throughout all renovation and new building projects.

The District is limiting the number of paint colors within buildings for both sustainability reasons and maintenance reasons. For regular maintenance, Districts require extra paint to perform touch ups etc. and having numerous paint colors means that multiple cans of extra paint have to be stored, correctly identified and used. If the District is out of that particular color, and the paint is no longer available from the manufacturer, that paint color has to be matched. All of these tasks require extra maintenance hours that having one or two colors of paint would not require. Unfortunately, paint also has a limited shelf life (typically only 3 years in the right conditions), and countless numbers of unused extra paint cans get disposed each year by institutions as large as SCCD. This is not environmentally sound. Limiting the District paint colors to one classic color that is less likely to be discontinued by the manufacturer means that less paint has to be stored and fewer maintenance hours are needed. Color richness in buildings should be achieved through other materials such as flooring, wall coverings/wall paneling, ceilings, furniture etc. However, should cost prohibit the use of materials that can provide color interest, the District will permit the limited use of feature painted walls in certain instances to create visual interest within a room or space.

Note: these Design Standards are a tool to clarify direction and streamline project execution for design professionals, construction managers and other participants in capital improvement projects. They represent the District's "strong preference" and should be applied, when possible, without compromising the creativity of the overall design. Final disposition, color, size, product choice etc. should conform to the best extent possible where equivalent substitutes are allowed in the Design Standard. If equivalent substitutes are allowed only "if performance and quality equivalency can be evidenced" or the consultant wishes to deviate from the written design standards for other reasons, then the consultant needs to provide evidence/justification and seek District approval as outlined in the ***Open this Document First: Standards Process.pdf***. In all cases the written design standards do not diminish or eliminate the standard of care owed by the consultant to SCCD or relieve, in any manner whatsoever, a consultant from any professional responsibility, duty or due diligence required toward that work.

Design Standard:

1. **Typical Interior Paint**

- SCCD has standardized on latex (water based) paints for the indoor environment for the following reasons:

- Water-based paints are the safest option for the people who handle them and the environment (Zero to Low VOC).
- Latex paints have a less objectionable odor, which makes them good for repaints and painting in occupied areas, where solvent odor is an issue.
- They clean up with soap and water; there's no need to work with hazardous and/or flammable solvents, and no used solvent to dispose of afterwards.
- Latex paints dry faster, and can be recoated sooner; this makes them a good choice for painting in occupied areas, where someone might touch or brush up against the freshly painted surface.
- Latex paint binders hold up better in sun-exposed areas, because they're more resistant to UV (ultraviolet) radiation.
- Latex paint films are less prone to yellowing over time, especially with white, light off-white and pastel colors.
- Latex paint films are more breathable; they allow small amounts of water vapor to pass through the film, so the chance of blistering is reduced. This is especially important when the surface being painted is slightly damp.
- Latex paint films have better gloss and color retention, so they'll keep a 'like-new' appearance longer.
- Latex paint films are more elastic, so they can expand and contract with the substrate better; this means they'll be less likely to crack and peel over time.

- SCCD has standardized on one color: Sherwin Williams, Navajo White, Zero VOC.
- A very limited quantity of interior accent color walls may be permitted upon District approval, and color must be from the palette of approved exterior colors.

2. Whiteboard Paint for Teaching Walls

- While white boards are the District standard for teaching walls, wall painted with high performance dryerase formula paint may be approved by the District for special locations. If approved, provide per the following:
  - Product: IdeaPaint Pro or demonstrated equivalent.
  - Field applied, durable dry erase coating.
  - LEED compliant (Low VOC).
  - Color: White.
  - Substrate: Gypsum Board Level 5 finish.
  - Application: HVLP Spray application per professional installer, final finish to be smooth and free of texture.
  - Warranty: 10 years.
  - Location: one wall in room (certain room types may require more than one), from base to ceiling level.
  - Special Considerations: do not locate any wall-mounted items such as strobes, fire alarm pull stations, phones on this wall, unless they have been specifically approved by end users. Outlets should be located no higher than 18" above finish floor, unless approved by end users.
  - Manufacturer Qualifications: minimum of 3 years manufacturing dry-erase coatings.

Approved Manufacturers:

Latex Paint: Sherwin Williams.
Whiteboard Paint: IdeaPaint.

Substitutes Allowed:

No substitutions allowed.

Associated Design Standards and Construction Specifications:

Design Standard for Exterior Paint

End of Document

DESIGN STANDARD for Restrooms

Purpose:

Restrooms should be consistent throughout Solano Community College District (SCCD) to provide aesthetically pleasing, clean, well lit restrooms with durable fixtures, fittings and finishes that are cost effective to maintain.

- Products should be selected based on the following criteria:
- Durability
- Ease of Maintenance (including availability of parts)
- Ease of Operation
- Anti Graffiti Properties
- Aesthetics
- Sustainability: products that reduce water and energy consumption, are sustainably produced, and assist with quality of indoor air.

Note: these Design Standards are a tool to clarify direction and streamline project execution for design professionals, construction managers and other participants in capital improvement projects. They represent the District's "strong preference" and should be applied, when possible, without compromising the creativity of the overall design. Final disposition, color, size, product choice etc. should conform to the best extent possible where equivalent substitutes are allowed in the Design Standard. If equivalent substitutes are allowed only "if performance and quality equivalency can be evidenced" or the consultant wishes to deviate from the written design standards for other reasons, then the consultant needs to provide evidence/justification and seek District approval as outlined in the ***Open this Document First: Standards Process.pdf***. In all cases the written design standards do not diminish or eliminate the standard of care owed by the consultant to SCCD or relieve, in any manner whatsoever, a consultant from any professional responsibility, duty or due diligence required toward that work.

Design Standard:

A. Entries and Signage:

1) Entries to restrooms should be well-signed and easily located.
   a) If the entry is hidden in an alcove, provide a double-sided flag-type sign (one perpendicular to the wall plane) that clearly marks the restroom location in the hallway leading to the alcove.
   b) Unless approved by Director of Facilities, restrooms must have entry doors.
   c) Per the discretion of the Director of Facilities, high-use restrooms in new buildings may consider door-less restrooms with privacy wall entries. This will facilitate entry/exit traffic into these high-use restrooms. Note: door-less restrooms must provide more stringent negative air pressurization to eliminate odor pollution in adjacent areas.
   d) Regardless of whether it has a door or not, each restroom should be numbered and clearly signed, so that the room can be easily found and matched with the SCCD space inventory. See **Design Standard on Building, Floor, Room, Stair, Elevator, Equipment and Outlets Designation**.

B. Door Related:

1) Comply with **Design Standard for Door Hardware** and provide:
   a) Public multi-stall restrooms remain unlocked except when locked by maintenance/security personnel.
   b) Public single stall restrooms remain unlocked except when locked by maintenance/ security personnel.
   c) Staff single stall restrooms remain locked at all times and indicate clearly when the room is occupied.
   d) All restroom entry doors require a kick plate to protect door from custodial carts.

2) Provide Wood door per **Design Standard for Doors and Door Frames**.

3) Provide Hollow Metal door frames per **Design Standard for Doors and Door Frames**.

4) Provide Door Thresholds as follows:
   a) Provide a light-colored marble threshold, size to match width of door jamb, to transition between restroom ceramic tile and hallway finish. Height of threshold should comply with CBC Code requirements for Accessibility.
   b) Provide Schluter™ Schiene or Schluter™ Deco transition piece to separate finishes between restroom and adjacent hallway at cased opening/jamb.

C. Restroom Finishes

1) These standards apply to New Buildings and Major Renovations. When renovating restrooms that are more than 20 years old, gut and replace everything down to the original wall studs. For restrooms that have been built or remodeled in the last 20 years, replace those items that are feasible and cost effective to match these standards.

2) The SCCD standard for **Restroom Floors** is as follows:
   a) Provide ceramic mosaic tile in minimum 6" x 6" size.
   b) Provide ceramic tile in colors that camouflage dirt and stains.
   c) Number of colors not to exceed 5 different colors.
   d) Provide a 12-inch wide darker color border on floor, in a color that has a matching cove tile base.
   e) Pattern within border can be random (makes for easier replacement).
   f) Select grout color to minimize appearance of stains.

g) Provide same colored grout for both floors and walls, this will allow installer to complete installation in a single installation, thereby reducing cost to District.

3) The SCCD standard for **Restroom Walls** is as follows:
   a) Provide ceramic tile to start above built-up cove tile base (6" tall in total) to approximately 6 inches below the ceiling. Exact height should be determined by full tile heights. Providing this gap at ceiling avoids the cost of scribing the wall tile to an imperfect ceiling line.
   b) Provide ceramic tile in a 6" x 6" size, semi-gloss finish.
   c) Provide one predominant light colored tile for majority of wall.
   d) Provide bull-nose version of this tile for the top row.
   e) Provide a wall tile accent band in one of the floor tile colors at a visually appealing height (about two-thirds of total wall tile height measured from the floor).
   f) District currently applies 286 wipe epoxy graffiti sealant on wall tile. In the event that tile companies start to provide built-in anti-graffiti coatings on their tile products, design teams should bring these tile products to District Facilities attention for evaluation.
   g) Use same grout color as floor grout (see above).

4) The SCCD standard for **Restroom Ceilings and 6" Band at Top of Wall** is as follows:
   a) Provide gypsum board painted District Standard White Color in semi-gloss finish. Refer to **Design Standard for Interior Paint**.

D. Toilet Compartments and Urinal Screens

1) Basis of Design: Bobrick Washroom Equipment, Inc; Sierra Series Toilet Partitions and Urinal Privacy Screens, gap-free and vandal resistant. Color: SC02 Desert Beige. District chooses this manufacturer because it meets the District criteria for performance, sustainability and maintenance. District preference for one color is to enhance the ability to quickly repair/replace these as needed by stocking components from this one manufacturer in one color.

2) Toilet Compartments should perform to the following criteria:
   a) Material: all Stiles, Panels, Doors and Screens shall be Solid Color Reinforced Composite material and edges of material shall be the same color as the surface. Toilet partitions constructed of High Density Polyethylene (HDPE) or High Density Polypropylene will not be acceptable.
   b) Design: interlocking design with no sight lines between Doors and Stiles.
   c) Material shall have a non-ghosting, graffiti-resistant surface integrally bonded to core through a series of manufacturing steps requiring thermal and mechanical pressure.
   d) Stiles and doors shall be 3/4" (19 mm); Panels shall be 1/2" (13mm).
   e) Graffiti Resistance (ASTM D 6578): Passed cleanability test; 5 staining agents.
   f) Scratch Resistance (ASTM D 2197): Maximum load value exceeds 10 kilograms.
   g) Impact Resistance (ASTM D 2794): Maximum impact force exceeds 30 inch-pounds.
   h) Smoke Developed Index (ASTM E 84): Less than 450.
   i) Flame Spread Index (ASTM E 84): Less than 75.
   j) Sustainability Contribution: partition material shall contribute to the following sustainability goals (per USGBC's LEED credits):
      - Materials and Resource Credits MR5.1 and MR5.2 – Regional Materials; submit manufacturer's calculation of value of recycled content for specified products, calculated in accordance with USGBC LEED certification requirements.
      - Materials and Resource Credit MR7- Certified Wood; submit manufacturers certification that a minimum of 50% of wood based materials are certified in accordance with Forest Stewardship Council (FSC) Guidelines.
      - Indoor Environmental Quality Credit IEQ 4 - No Added Urea Formaldehyde; submit manufacturer's certification that composite and agrifiber products contain no added urea-formaldehyde resins and that laminating used to fabricate on-site and shop-applied composite wood and agrifiber contain no added urea-formaldehyde resins.
   k) Hardware:
      - Compliance: Operable with one hand, without tight grasping, pinching, or twisting of the wrist, and force to operate does not exceed five pounds.
      - Emergency Access: Hinges, latch allow door to be lifted over keeper from outside compartment on in-swing doors.
      - Materials: 18-8, Type 304, heavy-gauge stainless steel with satin finish. Chrome-plated "Zamak", aluminum, or extruded plastic hardware not acceptable.
      - Fastening: Hardware secured to door and stile by through-bolted, theft-resistant, pin-in-head Torx stainless steel machine screws into factory-installed, threaded brass inserts. Fasteners secured directly into core not acceptable.
        - Threaded Brass Inserts: Factory-installed; withstand direct pull force exceeding 1500 lb (680 kg) per insert.
      - Hardware Type: Institutional Hardware (.67).
        - Latching: 14 gauge (2 mm) sliding door latch, 11 gauge (3.2mm) keeper; latch slides on a shock-resistant nylon track. Twist-style door latch operation not acceptable.
        - Hinges: 16-gauge (1.6 mm) stainless steel, self-closing, 3 section hinges.
          - Product: Bobrick commercial grade, self-closing. No substitutions.
        - Mounting Brackets: 18 gauge (1.2mm) stainless steel and extend full height of panel.
          - U-Channels: Secure panels to stiles
          - Angle Brackets: Secure stiles-to-walls and panels-to-walls.
   l) Compartment Hooks: In each toilet compartment, furnish and install a Bobrick B212 Clothes Hook and Bumper at 38 to 40" AFF for a barrier-free installation. Utilize through-bolted, stainless steel, pin-in-head Torx sex bolt fasteners.
   m) Stiles: Floor-Anchored stiles furnished with expansion shields and threaded rods.
      - Leveling Devices: 7 gauge, 3/16 inches (5 mm) thick, corrosion-resistant, chromate-treated, double zinc-plated steel angle leveling bar bolted to stile; furnished with 3/8 inch (10 mm) diameter threaded rods, hex nuts, lock washers, flat washers, spacer sleeves, expansion anchors, and shoe retainers.

- Stile Shoes: One-piece, 22 gauge (0.8 mm), 18-8, Type 304 stainless steel, 4 inch (102 mm) height; tops with 90 degree return to stile. One-piece shoe capable of adapting to 3/4 inch (19 mm) or 1 inch (25 mm) stile thickness and capable of being fastened (by clip) to stiles starting at wall line.

n) Wall Posts: Pre-drilled for door hardware, 18-8, Type 304, 16 gauge (1.6 mm) stainless steel with satin finish; 1 inch (25 mm) x 1-1/2 inches (38 mm) x 58 inches high (1473 mm).

o) Anchors: Expansion shields and threaded rods at floor connections as applicable. Threaded rods secured to supports above ceiling as applicable. Supports above ceiling furnished and installed as Work of Section 055000.

p) Overhead Braced Headrail: shall be satin finish, extruded anodized aluminum headrails, 0.065 inch (1.65 mm) thick with anti-grip profile.

q) Warranty: furnish 10 year limited warranty for panels, doors, and stiles against breakage, corrosion, de-lamination, and defects in factory workmanship. Furnish 1 year guarantee against defects in material and workmanship for stainless steel door hardware and mounting brackets.

E. Lighting

1) Lighting should be designed to provide consistent and adequate lighting throughout the restroom.
2) Design lighting at and around the mirror to ensure that glare is minimized.
3) Provide appropriate placement and access of light fixtures for quick and easy maintenance removal or replacement of lamps and ballasts. Consider what is involved for someone to access a fixture to change a lamp or ballast.
   a) Lighting should be placed on the ceiling in an open space, in the middle of the restroom to ensure quick and easy access to the fixture. Lighting should illuminate the stalls as well as the circulation area.
      - **Do not** place light fixtures over toilets or inside partitioned areas. Access is too difficult and time consuming for maintenance and lamp/ballast removal and replacement.
   b) Select equipment that can be easily maintained by one person using only their hands.
      - **Do not** specify light fixtures that require tools to remove/replace the lenses and lamps.
   c) Install motion sensors for restroom lighting control to save energy and provide flexibility for restroom use after hours.
      - Specify a style that will be able to "see" motion in as many areas of the room as possible, including to the extent possible the areas within the toilet partitions; this is likely to be a ceiling-mounted sensor (or 2) in multi-stall restrooms.
      - A wall switch/sensor combination may suffice in a single stall restroom.
      - Specify a time delay on the motion sensor of 30 minutes.

F. Plumbing Fixtures:

1) Comply with **Design Standard for Plumbing Fixtures** for plumbing fixtures, hose bibs and floor drains in each restroom.

G. Plumbing Isolation Valves

1) Plumbing isolation valves shall be installed for each restroom, to be located in an access panel of no less than 8" x 8" clear for ease of access, and preferably inside the restroom itself.

H. Accessories

1) Mount Accessories to comply with accessibility requirements per most recent Building Codes. Where "ADA Compliant Height" is used in this Standard it refers to both the clearances around that item that are required, as well as the height of whatever *component* of that item that needs to be located per ADA code requirements.

2) Basis of Design: Bobrick Washroom Equipment, Inc.
   a) Toilet Tissue and Seat Cover Dispensers/Napkin Disposals
      i) Bobrick B-357 Classic Series for all multi-stall restrooms. This unit mounts centered through the toilet partition, can be used from both sides and is services from one side. Capacity: 0.8 gal. (3.0L). Holds 1000 toilet seat covers and four rolls of tissue, two for each compartment. It also features theft-resistant spindles.
      ii) Bobrick B-3571 or 3574 as needed to achieve accessible clearances within stalls.
      iii) In wall conditions where a recessed unit is not physically possible, specify Bobrick B-4288 ConturaSeries® surface-mounted multi-roll toilet tissue dispenser, Bobrick B-4221 ConturaSeries® surface-mounted seat-cover dispenser, and Bobrick B-270 ConturaSeries® surface-mounted sanitary napkin disposal.
   b) Towel Dispensers and Waste Containers
      i) Bobrick B-3944 : provide combination unit multi-fold towel dispenser/semi-recessed waste containers placed near the sinks and toward the door. Note waste can depth has to be 8" for anything less does not accommodate the waste produced.
         - In Multi-Stall Restrooms provide one B-3944 at ADA compliant height and one B-3944 at standard height.
         - In all other restrooms where only one B-3944 is required mount it at ADA compliant height.
      ii) Restrooms should be designed to accommodate an additional free-standing waste cans area of four (4)-square feet near the door, inside the restroom. This waste cans area should not interfere with required clearances at or around the door.
      iii) In layout of interior wall elevations, provide space for District's vendor paper towel dispenser. Dispensers mounting is allowable on ceramic tile or mirror surfaces.
   c) Mirrors, Shelves and Hooks
      i) Multi-Stall Restrooms:
         - Individual mirror over each sink. Avoid one continuous mirror over muti-sink area.
         - One full-length mirror, Bobrick B165 2460.
         - One 2' Stainless Steel Shelf, Bobrick B-298x24, in close proximity of mirror and within view of mirror reflection, mounted at ADA compliant height.
         - Two wall-mounted hooks, Bobrick B6707, in close proximity of mirror and within view of mirror reflection, mounted at ADA compliant height.

ii) Single Restrooms:
- Single-sized mirror over each sink, with a shelf for all other restrooms. Bobrick B166 1836.
- One wall-mounted hook, Bobrick B6707, in close proximity of mirror and within view of mirror reflection, mounted at ADA compliant height.

iii) All Restrooms:
- Provide Graffiti-film on mirrors that do not change mirror reflective properties including color.

d) Soap Dispensers
i) Wall-mounted on wing (return) walls where mirror is continuous, at ADA compliant heights.
ii) Wall-mounted between mirrors, at ADA compliant heights, at all other restrooms.
iii) Dispensers shall be mechanically fastened, tape mounted installation is prohibited.
iv) Dispensers to be foam soap type, District vendor provided, contractor installed.

e) Diaper Changing Stations
i) Provide in both male and female multi-stall restrooms in community-use facilities such as Student Centers, Student Services, Library Learning Resource Center, Gymnasiums and Theaters.
ii) If a unisex family single stall restroom is provided in the facility, locate the Baby Changing Station in that restroom in lieu of locating in male and female multi-stall restrooms.
iii) Provide Bobrick (Koala Bear) KB110-SSRE, Horizontal, Recessed Mounted Baby Changing Station, mounted at ADA compliant height.
iv) Locate in an area where the use of the Baby Changing Station will not interfere with access requirements for the restroom. **Do not** locate Baby Changing Stations in stalls.
v) Provide Signage indicating "Baby Changing Station" on restroom doors where a Baby Changing Station is provided.

Approved Manufacturers:

- Ceramic Tile: Daltile, American Olean or Equivalent.
- Toilet Partitions: Bobrick Washroom Equipment, Inc; Sierra Series Toilet Partitions or Demonstrated equivalent if approved in writing by Director of Facilities.
- Toilet Accessories: Bobrick Washroom Equipment, Inc or Equivalent.

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Construction Specifications

Design Standard on Building, Floor, Room, Stair, Elevator, Equipment and Outlets Designation.
Design Standard on Door Hardware.
Design Standard on Doors and Door Frames.
Design Standard on Interior Painting.
Design Standard for Plumbing Fixtures

End of Document

DESIGN STANDARD for Vending Spaces

Purpose:

The purpose of this design standard is to ensure consistency in the provision of vending spaces at each campus, in a manner that is aesthetically pleasing to the environment, yet convenient for all users.

Design Standard:

- Vending machines should be installed at high traffic locations around each campus, for the convenience of students, staff and visitors. Machines shall vend beverages and snacks.
- Design professionals shall inquire during the design phase as to whether vending machines are desired in the facility, as well as quantities and locations.
- Wherever possible, create vending rooms (with open doorways, no doors) off the entrance lobby for vending machines, so that the machines are accessible without visually detracting from an orderly and aesthetically pleasing instructional environment. Provide glazing into the vending machine area from adjacent traffic area, if an as needed to enhance security.
- Where vending rooms are not possible, create recessed alcoves for vending machines.
- Where vending machines are to be installed at an exterior location, plan for extra security measures against vandalism. These measures will be provided by Vending Provider but Design Professionals should be aware of them:
  - Machines to be caged and lockable.
  - A minimum of 3/8" wedge anchor into concrete, minimum 3" embed.
  - Identify trip hazards.
  - Flooring under vending machines to be sealed concrete if possible. In no case shall it be carpet.
- SCCD is currently under contract with Pepsi for beverage and Canteen for snack vending machine sales, respectively.

Substitutes Allowed:

Not applicable.

Associated Design Standards and Construction Specifications

Not applicable.

End of Document

DESIGN STANDARD for Wall and Corner Protection

Purpose:

The purpose of this design standard it to protect interior surfaces that are vulnerable to excessive wear and tear due to high volumes of traffic, movement of furniture and custodial/supply carts. The need to maintain a neat and orderly appearance, while prolonging the life of interior finishes, needs to be balanced with the College aesthetic values in appearing welcoming but not overly institutional.

Note: these Design Standards are a tool to clarify direction and streamline project execution for design professionals, construction managers and other participants in capital improvement projects. They represent the District's "strong preference" and should be applied, when possible, without compromising the creativity of the overall design. Final disposition, color, size, product choice etc. should conform to the best extent possible where equivalent substitutes are allowed in the Design Standard. If equivalent substitutes are allowed only "if performance and quality equivalency can be evidenced" or the consultant wishes to deviate from the written design standards for other reasons, then the consultant needs to provide evidence/justification and seek District approval as outlined in the ***Open this Document First: Standards Process.pdf***. In all cases the written design standards do not diminish or eliminate the standard of care owed by the consultant to SCCD or relieve, in any manner whatsoever, a consultant from any professional responsibility, duty or due diligence required toward that work.

Design Standard:

Corner Protection

- Corners need to be protected by full-height surface mounted corner guards in high volume areas like Elevator Lobbies, Restrooms and Service Areas.
- At aesthetically important areas such as building lobbies consider Flush Mounted Corner Guards.
- Other Hallway/Corridor corners should be protected by a 5' high corner guard.
- Products: Stainless Steel if appropriate or InPro Corp, Aluminum Surface Mount Corner Guards in Antique White.

Wall Protection: Classrooms

- In classrooms with moveable furniture provide a Chair Rail to protect wall surfaces and furniture from furniture dents caused by furniture scraping wall surfaces.
  - Simple profile Wood chair rails, 2" to 3" tall are preferred. Wood finish to match/coordinate with other interior finishes/colors.

Wall Protection: Corridors/Hallways

- In Corridors/Hallways with high traffic provide a Chair Rail to protect wall finishes from custodial and supply carts.
  - Simple profile Wood chair rails, 2" to 3" tall are preferred. Wood finish to match/coordinate with other interior finishes/colors.
- Given the propensity to post multiple notices in these types of hallways/corridors, design professionals should provide areas within these corridors/hallways where these notices would be posted. To help hide the multiple pinpricks from notice posting, design teams should specify:
  - Wallcoverings similar to Carnegie's Xorel Wallcoverings with X-Protect Wall backing. These wallcoverings are sustainably produced and are free of PVC, chlorine, plasticizers, heavy metals and ozone depleting chemicals, making them extremely low VOC. They are also easily cleaned with water based solvents and bleach.
  - Wallcoverings should be either full height or above chair rail to ceiling.

Wall Protection: Custodial Service Sinks and similar service areas

- Service areas that accommodate supply carts or experience intensive activity that may damage wall surfaces should be specified with Rigid Sheet Wall protection similar to the wall area around the Custodial Service Sink (see **Design Standard for Custodial Spaces**) and per below:
  - Material: Rigid Sheet Vinyl Material
  - Thickness: no less than 0.040"
  - Height: 48 inches Above Finish Floor.
  - Product: InPro Corp. Wall Protection
  - Standard Color: Antique White

Approved Manufacturers:

Per above.

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Construction Specifications

Not Applicable

End of Document

DESIGN STANDARD for White Boards

Purpose:

The purpose of this document is to standardize whiteboards used throughout the District's facilities. This design standard achieved the purpose of consistency, maintenance, and aesthetic qualities of this equipment throughout the District.

Design Standard:

- Provide and install in each classroom, lab or teaching space. Install as needed in other offices or spaces in District facilities.
- Size: Standard dimensions of whiteboards: 8'0"w x 4'0"h. Other dimensions may be allowed for special conditions if and as approved by the District.
- Color: White.
- Material: Whiteboards to be provided with anodized aluminum frames, continuous anodized aluminum marker/eraser tray at bottom edge, cork strop, map clips, and flag holder at top edge.
- Location: teaching walls – minimum 16 lineal feet, other areas as needed.
- Whiteboards to be mechanically anchored to the wall; adhesive not allowed.
- Special Considerations: do not locate any wall-mounted items such as strobes, fire alarm pull-stations, phones, on the area of the whiteboards.

Approved Manufacturers:

- Claridge.

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Construction Specifications

Install per manufacturer's specifications.

DESIGN STANDARD for Window Treatments

Purpose:

Indoor spaces at SCCD should be naturally daylight to the best extent possible for numerous health, well-being and sustainability reasons. However, window shading may be required for solar shading, black-out and provision of privacy at different times of the day. The District wishes to standardize the treatment of windows to provide a consistent aesthetic look to the campus and to implement solutions that are cost effective to maintain.

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Design Standard:

Each building should have <u>one</u> consistent treatment for all exterior windows that need shading. In other words do not provide some windows with vertical blinds and others with roller shades. The decision on which of the following treatments should be provided should be based on the predominant use of the building. For example a predominantly public or classroom building should provide Solar Roller Shades while a predominantly office building should provide vertical blinds.

1. **Public and High Use Spaces: Solar Roller Shades**
   For buildings with many public spaces like lobbies, lounges, meeting rooms and high use areas like classrooms, laboratories etc, provide Solar Roller Shades. These offer the following performance and maintenance features:
   - The shade cloth filters the sunlight, lowers solar heat gain, and improves occupant comfort by reducing eye strain due to glare.
   - The shade cloth is an open weave and therefore allows some transparency that affords a visual connection to the exterior environment. During daylight hours, this also provides some degree of privacy. (For security reasons, it should be understood that at night, however, the situation is reversed, and the view to the outside is obscured, but the view to the interior is unimpeded).

- The flat surface and washable fabric is easy to clean. This ease of maintenance allows for easy and regular cleaning by our custodial crews, limiting dust in the indoor environment and improving indoor air quality.
- Damaged fabric can be easily replaced by local staff, reducing the life-cycle cost of ownership.
- Manufacturer offers 25 year on-site parts warranty on all products, further reducing SCCD's life cycle cost of ownership.
- Installation technicians are manufacturer-certified, ensuring quality in installation.

Guidelines for application:

- Shades shall be single layer installations.
    - In special circumstances where a room has a programmatic requirement of complete black out capability a simple and economical black out curtain using a rod and ring system should be designed.
- Side channels shall not to be used.
- Cord-stays shall be specified for all manually-operated shades.
- Metal on metal gearing mechanism, and metal chains for operation shall be specified. This configuration provides a higher ratio of pull action to shade movement.
- Shades covering heights of over 15 feet shall be motorized, to prevent possible operator injury from heavy lifting.
- The shade fabric shall be a maximum of 8 ft in width, to prevent possible operator injury from heavy lifting.
- Shade widths should be equally spaced across an opening if longer than 8'-0" in width. Where mullions occur within the opening, matching the mullion spacing is preferred. Minimum allowable shade width shall be governed by the actual size of the opening, or the condition where if the width were added to the next adjacent opening, the combined width would result in a shade greater than 8 feet.
- When multiple shades are to be operated in unison (e.g., a forum-sized lecture room, a library, a large conference room or event space), the shades shall be motorized and have ganged controls.
- Where the top rail will be visible, specify a metal fascia to match the color of the shade. Specify the longest possible lengths for fascias, for the best aesthetic effect.
- When possible, specify inside mounting.

MechoShade Systems is the preferred manufacturer of solar roller shades, approved products:

- **1000 Series Dense Vertical Weave** with 2-3% Openness Factor provides a uniform color on either side of the window. This is the preferred product, as it provides an acceptable level of solar control while also offering transparency. Note that darker colored shade cloth affords greater transparency and enhanced views to the outside environment.
  Color: 1004 Black/Brown.
- **0700 Series Blackout** ShadeCloths are an opaque vinyl/fiberglass/vinyl laminated shadecloth that is appropriate for multi-media area functions. 0700 Series provides insulation and opacity at the window wall. If installing blackout shades in combination with solar shades, place blackout shade at plane closest to the window.
  Color: 0706 Oyster.

2. **Other Areas: Vertical Shades**
   For buildings with predominantly offices and lower use areas provide Vertical Blinds. The following is based on Levelor Vertical Blinds:
   - Vinyl Vertical Blinds with curved vanes
   - Vane Color: Brushed Aluminum.
   - Vanes to stack to one side.
   - Cordless Wand Control.
   - Where possible, specify inside mounting.
   - Where rail is visible, provide a Valance: DesignLine – Tailored, color coordinated with Vane Color.

3. **Glazing within Doors**
   Glazing in Doors should be specified with fritted screens integral in the glazing or should have coatings applied to the glazing surface. Do not specify blinds (either integral or surface mounted) for glazing in doors.

Approved Manufacturers:

- Mechoshade
- Levelor

Substitutes Allowed:

No substitutes allowed.

Associated Design Standards and Construction Specifications

Not Applicable.

End of Document

DESIGN STANDARD for Thermoplastic Single-Ply Roofing

Purpose:

Thermoplastic single-ply roofing shall be the District Standard for roofing. The purpose of this design standard is to achieve the following performance and sustainability criteria for thermoplastic single-ply roofing installed at the Solano Community College District sites:

- Heat-reflective and energy efficient roofing system
- Exceptional resistance to ultraviolet, ozone and chemical exposure

Note: These Design Standards are a tool to clarify direction and streamline project execution for design professionals, construction managers and other participants in capital improvement projects. They represent the District's "strong preference" and should be applied, when possible, without compromising the creativity of the overall design. Final disposition, color, size, product choice etc. should conform to the best extent possible where equivalent substitutes are allowed in the Design Standard. If equivalent substitutes are allowed only "if performance and quality equivalency can be evidenced" or the consultant wishes to deviate from the written design standards for other reasons, then the consultant needs to provide evidence/justification and seek District approval as outlined in the ***Open this Document First: Standards Process.pdf***. In all cases the written design standards do not diminish or eliminate the standard of care owed by the consultant to SCCD or relieve, in any manner whatsoever, a consultant from any professional responsibility, duty or due diligence required toward that work.

Design Standard:

- Basis of Design: 80-mil.

  Membrane thickness over the reinforcing scrim (top-ply thickness) shall be nominal 23 mil thick or greater.

  Face Color: White, Grey, Tan

- Provide an installed roofing membrane and base flashing system that does not permit the passage of water, and will withstand the design pressures determined in FM Global's Loss Prevention Data Sheet 1-28, to meet a 1-90 wind uplift rating.
- Installer shall provide all primary roofing materials that are physically and chemically compatible when installed in accordance with manufacturers current application requirements.
- Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspection agency to resist uplift pressure calculated according to ASCE 7-10.
- Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspection agency acceptable to authorities having jurisdiction. Material shall be identified with appropriate markings of applicable testing and inspecting agency.
  - Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
  - Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which the roofing system is a part.
- FMG Listing: provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system and that are listed in FMG's Approval Guide for Class 1 or noncombustible construction, as applicable. Identify material with FMG markings.
  - Fire/Windstorm Classification: Class 1 A-90
  - Hail Resistance: MH
  - Wind uplift: FM I-90
- Thermoplastic surface layer to meet the following criteria:
  - Minimum solar reflectance of .63
  - Minimum thermal emittance of .75 or a minimum SRI of 75.
- Installer's Qualifications:
  - Certificates: Signed by roofing system manufacturer certifying that installer is approved, authorized, or licensed by manufacturer to install roofing system.
  - Installer shall have a formalized Safety Program, a copy of the parameters of which will be provided to the Owner for his review and acceptance. Safety Program will include formal scheduled meetings and an outline of procedures to be used for each roofing project. Include a written Fall Protection Plan.
  - Must have installed a minimum of five (5) similar installations.

- Source Limitations: All components listed in this section shall be provided by a single manufacturer or approved by the primary roofing manufacturer.
- Final Inspection: Upon completion of the roofing installation, the applicator shall arrange for an inspection to be made by a non-sales technical representative from the manufacturer to provide and document a comprehensive final inspection and determine any corrective work required before a warranty will be issued.
- Installer Warranty: Provide a 2-year installer warranty in conformance with State of California regulations for roofing system.
- Manufacturer's Warranty: Provide a 20 year non-prorated Unlimited Warranty for Thermoplastic Roof Systems.
- Ensure that all existing mechanical equipment curbs are raised to meet current code and manufacturer’s requirements if new insulation changes the height between top of roofing and top of equipment curb.
- Ensure that all new walk path materials fully encircle mechanical equipment on the roof for servicing.
- Ensure that walk path materials are provided to ensure that every pathway requirement is met for safe foot travel on the roof (design to be reviewed and signed off on by SCCD Facilities staff.)
- Ensure that existing ladders and access hatches are reviewed and modified or replaced if necessary to comply with current code and safety regulations.

Approved Manufacturers:

- **Approved Manufacturers:**
  - Firestone Building Products – Ultra Ply TPO
  - Johns Manville – TPO Membrane
  - Carlisle SynTec Systems, Inc. – Sure Weld TPO
- **Materials:**
  - Unless otherwise approved by the specifier, all materials and products (including adhesive, sealant, insulation, fasteners, fastening plates and edgings) to be provided by the roofing system manufacturer and covered by warranty.
  - Flashing: Nominal 80-mil membrane shall be used for all flashing requirements to match the field membrane and warranty expectations selected for the roofing system.
  - Bonding Adhesive: Low VOC adhesive for bonding roofing membrane and sheet flashings to substrates and projection, per manufacturer.
  - Flashing Metal: Coated metal sheets made from 24 gauge galvanized steel with a minimum 0.035” thick non-reinforced white TPO laminate. Factory supplied in sheets and required for fabrication into metal base and curb flashings, sealant pans, and scupper sleeves.
  - Pre-Moulded Flashings: Injection molded vent stack and inside/outside corner flashing.
  - Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, 1" x 1/8" thickness, with anchors.
  - Miscellaneous Accessories: provide pourable sealers, counter flashing, reglets, cover strip and other accessories.
  - Cover Board: 1/2" min. thickness fibrous glass faced water resistant gypsum core cover board such as DensDeck Prime from G-P Gypsum or Securock from USG. Board size to be 4' x 4' for adhered applications. Manufactured to conform to ASTM C 1177.
  - Walkpads and Walkway Roll: Protective surface for roof traffic shall be Sure-Weld TPO Walkway Rolls with deep-embossed anti-slip tread surface.
  - Metal Edging: All metal edging shall be tested and meet ANSI/SPRI ES-1 standards and comply with Building Code.
  - Caulking: Provide caulking and sealant per TPO manufacturer.

Substitutes Allowed:

As noted in this Standard.

Associated Design Standards and Construction Specifications

As noted in this Standard.

Fire Protection Standards

DESIGN STANDARD for Basic Fire Protection System Design

Purpose:

The purpose of this document is to standardize the basic elements of the Fire Protection system design process. This design standard has the purpose of creating a consistent application of Fire Protection system design throughout the Solano Community College District therefore achieving a standard of quality for maintenance and reliability throughout all renovation and new building projects.

Design Standard:

Codes and Standards

- California Fire Code
- NFPA 13, Installation of Sprinkler Systems.
- NFPA 14, Standard for the Installation of Standpipe and Hose Systems
- NFPA, Automatic Sprinkler System Handbook.
- Underwriters Laboratories Fire Protection Equipment Directory.
- Factory Mutual Approval Guide.
- Local Fire Marshall

All new structures and structures receiving a major modernization will be protected by an approved wet pipe hydraulically calculated automatic fire sprinkler system designed, installed, and tested in accordance with NFPA 13, CCR Title 19, the California Fire Code and local Fire Marshal requirements. The fire sprinkler water connection will be connected to the site fire water service. The design and installation of wet sprinkler system will be by a Design/Build Fire Protection Contractor.

The Contractor is responsible for all hydraulic calculations, stamping of drawings by a California Licensed Engineer in conformance with all the jurisdictions requirements for submittal to local agencies for building permit, coordination with Architect, and getting approval from the AHJ.

Design and furnish all materials, labor and equipment necessary for installation of the hydraulically designed Automatic Wet Sprinkler System throughout the building as generally outlined herein:

- Service main from connection to campus water main to building entrance riser valve assembly (with post indicator shut off valve, back flow preventer and fire department hose connection).
- Required zone control valve assemblies, drain valves, pressure gauges and signs to identify all valves.
- Provide a stock of each type of sprinkler head in a locked box near the main fire riser of each building.
- Water flow and valve supervisory switches with alarm signals to building fire alarm system.
- All piping shall be concealed except in equipment type rooms that have no ceilings. In retrofit project, discuss merits of concealing pipes with the District.

Design based on flow and residual water pressure tests and submit to local and state Fire Marshal for approval prior to installation.

Sprinkler Head Use:

- Exposed, Upright – Mechanical Rooms without ceilings, Equipment Rooms without ceilings, Utilitarian Mechanical Type Shops, Electrical Rooms without ceiling, Telecom Rooms without ceilings.
- Semi-recessed – All removable tile ceilings and hard lid ceilings.
- Concealed – Only in architecturally sensitive locations to match architectural design intent.
- High Temperature – Utilize in all Mechanical Rooms, Electrical Rooms, Telecom Rooms or othere areas where high temperatures may be experienced.
- Sprinkler head Guard - Utilize in all Mechanical Rooms, Electrical Rooms, Telecom Rooms or other areas where damage to heads could easily result.
- See sprinkler layout detailed below. In corridors, sprinkler heads are ideally located along the centerline. However priority is given to the location of the light fixtures. In general, the District standards for the suspended acoustical tile ceilings includes a 2’x4’ tile with a routed groove which simulates a 2’x2’ tile. The sprinkler head layout should avoid placing heads over the routed groove, or within 6” of any tee.

Pre-Action Systems:

- Provide in all locations where damage due to water is deemed catastrophic (i.e. data centers). Determination of rooms requiring such shall be made by Solano Community College District as part of a risk mitigation consideration.
- Determine best application of single or double interlock as required and coordinate use with clean agent extinguishing system if required. Use clean agents that match existing inventories. Complete system parameters and design intent shall be coordinated with the Solano

Community College District project manager for risk assessment including use of cross zoned detection, VEDA systems, etc.

- All dry sprinkler piping shall be galvanized steel.

Fire Extinguisher Equipment in Sensitive Areas:

- Where fire extinguishers required in rooms primarily housing electronic equipment such as MDF. IDF, server rooms, and computer labs, use Ansul Cleanguard clean agent fire extinguishers that are corrosion-resistant with a clean agent that is electronically nonconductive and will not cause thermal shock damage, leaves no residue, and requires no clean up after discharge.
- Minimum UL and VLC rated. Code compliant.
- May also be appropriate for other sensitive areas.

Approved Manufacturers:

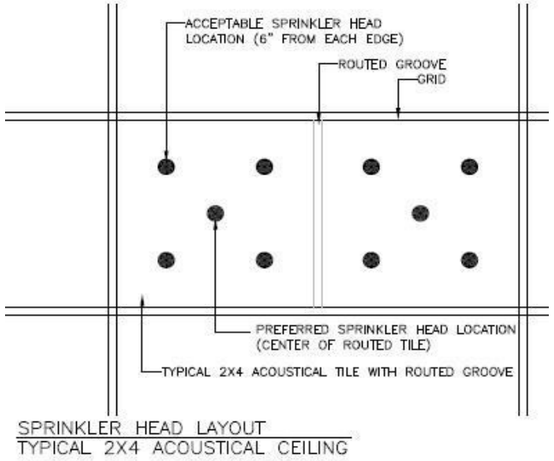
Extinguishers in Sensitive Areas: Ansul

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- All Division 21 Design Standards and Construction Specifications



SPRINKLER HEAD LAYOUT
TYPICAL 2X4 ACOUSTICAL CEILING

Plumbing Standards

DESIGN STANDARD for Basic Plumbing System Design

Purpose:

The purpose of this document is to standardize the basic elements of the Plumbing system design process. This design standard has the purpose of creating a consistent application of Plumbing system design throughout the Solano Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Codes – Systems will be designed in accordance with the latest edition of the following codes:

- Uniform Building Code; California Building Code.
- Uniform Mechanical Code; California Mechanical Code.
- Uniform Plumbing Code; California Plumbing Code.
- Uniform Fire Code; California Fire Code.
- National Electrical Code; California Electrical Code.
- State of California Code of Regulations (CCR).
- Energy Efficiency Standards and Title 24 Regulations.
- Local City of Newark Amendments and Regulations.
- DSA – Department of the State Architect.

Standards – The following reference standards shall be used for the design:

- ANSI – American National Standards Institute.
- ASME – American Society of Mechanical Engineers.
- ASSE – American Society of Sanitary Engineering.
- ASTM – American Society for Testing and Materials.
- AWS – American Welding Society.
- AWWA – American Water Work Association.

- CISPI – Cast Iron Soil Pipe Institute.
- CS – Commercial Standards.
- EPA – Environmental Protection Agency.
- NEMA – National Electrical Manufacturer's Association.
- NFPA – National Fire Protection Association.
- NFPA 10 – Portable Fire Extinguishers.
- NFPA 101 – Life Safety Code
- NSF – National Sanitation Foundation.
- PDI – Plumbing and Drainage Institute.
- UL – Underwriters' Laboratory.
- LEED – U.S. Green Building Council

Water Piping:

- Determine cold water service and building domestic hot and cold water demands for major buildings by the fixture unit method as outlined in the California Plumbing Code.
- Add known continuous demands to the total estimated demand.
- Size water piping with velocities not exceeding 7.5' per second and minimum of 35 pounds per square inch residual pressure at the highest, or last, fixture or hose rack. For copper pipe, size with velocities of 5' to 8' per second
- Take particular care in designing and sizing of cold water piping to any shower, or shower room, where the use of adjacent flush valve fixtures could affect the pressure and cause excessive temperature fluctuations. Consider the use of a pressure balancing valve between hot and cold water supplies, or separate line from a point that would not be affected by flushing of fixtures.

Soil and Waste, and Vent Piping

- Size soil and waste piping by the fixture unit method as outlined in the California Plumbing Code (CPC).
- Grade interior piping, above grade, at 1/4" per foot minimum; 1/8" is acceptable if the pipe size is increased to compensate for the 1% slope as required by California Plumbing Code (CPC)
- Vent all sanitary fixtures as required by code.
- Kitchen or Food Service Waste System: Design a separate waste system for any kitchen or food service and discharge through a grease trap/interceptor. Keep this system separate and connect at a point in the building sanitary sewer system where a stoppage below the connection will not back sewage up to kitchen or food service floor drains or sinks.
- Use corrosive-resistant pipe in any location where the waste may contain corrosives. Keep such waste and vent system separate from the building plumbing soil, waste and vent systems to a point outside the building. In buildings with minor isolated points of corrosive use, discuss the method of handling Solano Community College District.
- Use gravity flow for all building drainage systems. Where this appears to be impractical, discuss installation of pumps with Solano Community College District and obtain approval before proceeding with design.

Storm Piping

- Rainwater Leaders and Storm Drains: Compute rainwater quantity on the basis of 1.5" rainfall per hour minimum (.935 gallons per hour/square foot horizontal drainage area). Size all piping per CPC
- Grade interior piping, above grade, at 1/4" per foot minimum as required by California Plumbing Code (CPC)
- Insulate underbodies and horizontal mains.

Industrial Water Systems

- The industrial water system shall serve all points of water use that could cause contamination by their backflow into the domestic water system.
- Where an industrial water system is selected for a project, protect the domestic water system by installation of two approved reduced pressure backflow prevention devices in parallel at the point of connection.
- Detail the installation of the devices in an accessible location with the lower a minimum of 1' above the floor and the upper a maximum of 5'. Provide adequate drainage below the devices for testing or malfunction, via floor drains.
- Each outlet or connection to the industrial water system shall be posted with a sign reading Industrial Water - Do Not Drink. These may be waterproof clothtape with printing protected by clear vinyl and self-adhesive back; 1/4" high, black letters on yellow background.

Connections to Kitchen Equipment

- Kitchen equipment is normally furnished under the specification section for kitchen equipment
- Include a schedule in the plumbing drawings for the rough-in and final connections to all kitchen equipment
- Coordinate the furnishing of all equipment trim, such as traps, faucets and valves, with the kitchen equipment drawings and specifications
- Provide a pressure regulating valve, pressure gauge, pressure relief valve, thermometer and shock absorber in the 180° rinse line to the dishwasher connection

Back Flow Prevention

- The proper design, selection, installation and maintenance of cross-connection control devices is imperative for the protection of potable drinking water and distribution systems. Appropriate backflow prevention assemblies shall be selected.
- Provide backflow protection at any building water system where there are connections, actual or potential, to a contaminating liquid. Examples include connection from domestic system to HHW makeup and cooling towers
- Backflow may be prevented by installing a backflow prevention device at each individual point of possible contamination, where devices such as vacuum breakers or air gaps may be employed, or at a single point where an industrial water piping system takes off from the domestic water piping.

Roof, Floor, and Areaway Drains

- Include provisions in the design for coordination of drain and clean-out elevations and other work such as concrete and waterproofing
- Locate toilet room floor drains out of foot traffic below water closet partitions or between urinals
- Where floor drains are roughed in for future use, cover with a flush plate and gasket for protection against fume leakage
- Provide trap primers to retain trap seals on floor drains installed in areas where floors are not washed periodically or there is no regularly used water outlet to replenish trap seal.
- All floor drains to have 3" or larger traps plus trap primers
- All horizontal drain runs to have cleanouts on the end of the run on every floor
- Main drain stacks must have cleanouts installed on each floor

Hose Bibbs and Landscape Irrigation Service

- Provide keyless hose bibbs at important outside entrances to a building along each side of the building and never more than 50’ from a paved entrance for washing down purposes. Locate these as inconspicuously as possible consistent with accessibility. Provide a ground level hose bibb for wash-down at all large concrete areaways or shafts. Hose bibbs shall be supplied from an industrial water system or have separate RP device or vacuum breaker and backflow preventer on each hose bibb

Disinfection Of Water Systems

- Clean and disinfect the domestic hot and cold water systems, including fire systems connected to the domestic water systems, in accordance with the generally accepted standards and Codes. For remodeling work, modify the procedure as required to accommodate the occupants

Plumbing Isolating Valves

- Show all valves on drawings.
- Arrange and valve all utility services so that, as a minimum, each floor may be isolated
- Arrange and valve domestic hot and cold water piping so that toilet rooms can be isolated without interrupting service to other parts of the building
- Show sectionalizing valves in top center and bottom of risers in hot water supply and return systems
- Place valves on each side of backflow or check valve to permit servicing
- Show valves on all services left for future connections (tees, stubs, etc.) unless they are in a valved zone, or isolated by other valves, that permits only a minor loss of pipe contents when opened

Pipe Installation

- Specify a proper corrosion preventive wrapping for any black steel piping installed below grade (bituminous and paper wrapping or extruded plastic).
- Provide water hammer arrestors in water lines to equipment or fixtures having quick closing or flush valves and any equipment that might produce water hammer. Water hammer arrestors shall be certified by the Plumbing and Drainage Institute (PDI). Show location and size of all water hammer arrestors on plans and access for maintenance or replacement. Provide access panels if required.

- Show clean-outs in sewer lines as required by code. In addition, vertical to horizontal changes in main risers that occur above furred ceilings shall have a clean-out extended from the base to a floor clean-out or a wall clean-out above the change in direction
- Do not embed piping in concrete.

Kitchen Grease, Plaster, Sediment and Sand Traps

- In general, grease traps should be avoided except where required by code or other regulations. If required, locate for easy access and servicing, preferably outside, with proper venting
- Provide a sand and oil interceptor where required for separation of solids from the sanitary sewer system.

Fixtures, General

- Specify fixtures using a minimum of water consistent with fixture application. Install flow control devices to limit water use, except in tank and flushometer water closets and urinals.
- Vitreous ware shall be institutional quality
- Design cast iron enameled ware with acid-resisting enamel
- Design fixtures complete with trims, where applicable. Exposed trims shall be coordinated with finish of plumbing fittings
- Provide accessible fixtures per Architectural documentation.
- Provide stops in hot and cold water lines serving all fixtures, including hose bibs

Fixture Connections

- Exposed water supply pipe, tubing and waste piping connections shall be chrome-plated brass
- Fit supply pipe, tubing, and other connections with chrome-plated brass escutcheons at walls
- Cover exposed bolt heads in floor flanges of any fixture, in the back of any fixture, or in the fixture itself, with porcelain bolt caps securely held in place with putty
- Fit fixtures tight to walls and seal joint. Coordinate sealant with architectural
- Specify red brass for all nipples from copper water lines to fixture stops. Do not allow galvanized nipples

Sustainable Design Practices

- The Solano Community College District has a desire to build buildings utilizing sustainable design techniques. As part of the Plumbing Design Standards, sample sustainable design opportunities are provided in the table located in Sustainability Section of the Solano Community College District Standards. Each strategy needs to be integrated appropriately into their respective projects. Development of design strategies for each item is beyond the scope of this Design Standard and requires careful consideration for proper application. See table on following pages. The District will select on a case by case basis, which projects will be LEED™ Certified and to what level.

Approved Manufacturers:

Not Applicable

Substitutes Allowed:

Not Applicable

Associated Design Standards and Specifications

- All Division 22 Design Standards and Construction Specifications

DESIGN STANDARD for Plumbing Pipe and Fittings

Purpose:

The plumbing piping materials are an essential element of the plumbing systems. This design standard has the purpose of creating a consistent application of plumbing piping material requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, reliability, and energy efficiency throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation and testing of pipe, tubing and fittings for complete and operable systems.

- General Electrical Equipment Clearances: Do not route piping through electrical rooms, transformer vaults, elevator equipment rooms, and other electrical or electronic equipment spaces and enclosures. Within mechanical or plumbing equipment rooms, provide minimum 3 feet lateral clearance from sides of electric switchgear panels, MCC's, etc. Do not route piping above any electric power or lighting panel, switchgear, or similar electric device. Coordinate with electrical and coordinate exact pipe routing to provide proper clearance with such items.
- Welding Qualification: Qualify welding procedures, welders and operators in accordance with ANSI B31.9 for shop and project site welding of piping work.
- All piping shall meet the piping material requirements set forth:
  - Equipment: Provide pipe, tube and fittings of the type, fitting requirements, grade, class, size and weight indicated or required for each service, as indicated in other Division 22 Specifications.
  - Piping: Piping shall conform to ASTM or ANSI Standards and be approved by the governing Code for the application intended.
  - Excavation: Perform necessary excavation and backfill required for the installation of the plumbing work.
  - Tests: Test piping according to the requirements of Plumbing Code and submit "Certificate of Accessibility" to Owner. Test water piping at 150 PSIG for a period of 2 hours with no loss in pressure.
- Steel Pipe:
  - ASTM A-53-84a, Electric Resistance Welded or Seamless, Grade B: Black, unless otherwise indicated, Schedule as specified.
  - ASTM A-135-84, Grade B: Black, unless otherwise indicated, Schedule as specified.
- Copper Tube:
  - Temper: Provide hard drawn temper.
  - Water Service: ASTM B-88, type as indicated for each service.
  - Drain, Waste, and Vent (DWV): ASTM B-306.
- Cast Iron Pipe:
  - ASTM A74, Hub-and-Spigot, service weight.
  - CISPI 301-75 Hubless (No-Hub), including coupling assembly.
- Insulating (Dielectric) Unions: Standard units recommended by manufacturer for use in the service indicated, which isolate ferrous from nonferrous piping, and prevent galvanic corrosion action. Minimum rated "flashover" voltage: 600 volts. Watts 3000 Series. Provide insulated flanges for flanged piping system connection to dissimilar metals.
- Welding Materials: Comply with Section 2-C of ASME Boiler Code, as applicable.
- Tin-Antimony Soldering Materials: ASTM B13.
- Copper-Brazed: Make brazed joints for copper tubing and fittings with code approved brazing filler alloys meeting ASTM and AWS standards and listings. Filler alloys of BCuP2 classification (e.g., "Phos-O" or "Fos-Copper") may not be used to make joints between copper tubing and cast brass or bronze fittings. Installations conform to accepted published procedures, i.e., CPC Installation Standard 3-75 and CDA Publications. Use of steel wool for cleaning tube and fittings is prohibited.
- Unions: Provide unions at all threaded connections to equipment, regulators, and controls that may have to be removed or replaced and at all points where necessary for the disassembly of piping for maintenance. Detail piping and unions to allow removal of equipment without springing pipe.
  - Steel Pipe Union: 150 PSI malleable iron, brass to iron seat, ground joint, black or galvanized to match pipe

  - Copper Pipe Union: 200 PSI working pressure. Bronze body, solder or grooved ends. Pipes 2 inches and under use ground joint, pipes 2-1/2 inches and larger use flanged face or grooved ends
  - Insulating Unions: 250 PSI working pressure. Pipe ends and material to match piping. Electric current below 1 percent of galvanic current. Gasket material as recommended by manufacturer. Epco or approved

- Escutcheons:
  - Brass material, chrome plated finish. Size sufficient to cover pipe openings through wall, floor or ceiling. Set screw or spring to secure to pipe. Coordinate opening sizes

- Sleeves: Provide sleeves on pipes passing through concrete or masonry construction. Extend sleeve 1 inch above finished floor. Caulk pipes passing through floor with non-shrinking grout or approved caulking compound. Provide "Link-Seal" sleeve sealing system for slab on grade or exterior wall penetrations. Caulk/seal piping and ductwork passing through fire rated building assembly with UL rated assemblies. Provide fire-rated assemblies per local AHJ requirements.

- Corrosion Control: Underground Steel Piping Corrosion Protection: Factory wrap un-insulated underground steel piping systems with protective coating composed of a coal-tar saturated wrapping tape over a 20 mil thick coal-tar epoxy coating, equivalent to "Republic X-Tru-Coat." Wrap joints spirally with a minimum overlap of 1/2 tape width. Extend wrap not less than 3 inches above grade. . Provide cathodic protection to meet requirements of NACE Standard RP0169-2002.

- Pipe Tests:
  - Make test before pipes are concealed
  - Fill system and remove air from system at least 24 hours before test begins
  - Correct leaks in screwed fittings by remaking the joint. Cut out leaks in welded joints and reweld; caulking is not permitted
  - Apply test pressure of 125 PSI and maintain for 1 hour with no visible leaks and no appreciable drop after the test pump has been disconnected

Approved Manufacturers:

Not Applicable

Substitutes Allowed:

Not Applicable

Associated Design Standards and Specifications

- 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT
- 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT
- 22 11 13 – GENERAL PLUMBING PIPING SYSTEMS

DESIGN STANDARD for Common Motor Requirements for Plumbing Equipment

Purpose:

The motor requirements for plumbing equipment are an essential element of the plumbing systems. This design standard has the purpose of creating a consistent application of plumbing equipment motor requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, reliability, and energy efficiency throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation and testing for complete and operable motors and starters for plumbing equipment. These Design Standards are inclusive of motors that are field installed as well as integral to mechanical equipment.

All motors to meet the following requirements based on Code requirements and industry standard of care:

- Energy efficient, suitable for non-overloading operation, and capable of continuous operation at full nameplate rating. Motors 1 HP and larger must meet Energy Policy act of 1992. Motors to meet or exceed California Energy Commission Title 24 requirements.
- Take NEMA standards as minimum requirements for motor design and performance. Motors suitable for load, duty, voltage, frequency, hazard, and for service and location intended.
- For consistency and economy, motors, unless specified otherwise, to be general purpose open drip-proof type, ball bearing equipped, 40°C temperature rise, and rated for continuous duty under full load.
- To avoid unnecessary maintenance costs and early failure of equipment, all motors located outdoors to be TEFC motors (totally enclosed, fan cooled).
- Due to the harsh weather environment at Solano College, all motors exposed to the outside air stream (whether inside or outside of equipment) to be TEFC motors (totally enclosed, fan cooled).
- Motors smaller than 1/2 horsepower, 1 phase; and motors 1/2 horsepower and larger, 3 phase and voltage as indicated on Drawings. Maximum motor speed of 1750 RPM, unless otherwise noted. One phase motors to have internal thermal overload protection with automatic reset.
- Motors for belt drive to have adjustable bases with set screw to maintain belt tension.
- Provide inverter rated motors per NEMA MG1-31 where variable frequency drives are applied or where soft start starters are utilized.
- For consistency, all starters to be specified by Division 26.
- For consistency, all disconnects to be specified by Division 26.
- Motors to have name plate giving manufacturer's name, shop number, HP, RPM and current characteristics.
- Motor mounting to provide for anti-vibration isolation in order to minimize vibration for ceiling-mounted projectors.

Approved Manufacturers:

- General Electric
- Westinghouse
- Baldor
- Reliance

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 22 05 48 - VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT
- 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT
- 23 09 13 - VARIABLE FREQUENCY DRIVES

DESIGN STANDARD for General Duty Valves for Plumbing

Purpose:

The plumbing valves are an essential element of the plumbing systems. This design standard has the purpose of creating a consistent application of plumbing valve requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation and testing of valves for a complete and operable systems.

All valves of a particular type and size range on any one project shall be the product of one manufacturer.

Valves shall be designed to be installed with the valve bonnet in an upright position to prevent deterioration or corrosion of the bonnet and packing.

Valve body materials shall be compatible with piping system materials.

A valve drain shall be provided at the base of each water piping riser and manual air vents shall be provided at the top of each riser and at the high point of the system.

All valves shall be provided with reusable strap-on insulation covers.

All exposed valves in finished areas shall be chrome-plated.

Insulation: Where insulation is indicated, install extended stem valves, arranged in proper manner to receive insulation

Design access panels, where a removal type ceiling is not planned, into the project so all valves are accessible

Locate isolation valves so that it is possible to isolate separate floors, separate wings, machinery rooms and other natural subdivisions of the building. Design isolation valves on each side of equipment to permit servicing or removal without draining system. Design valves at all services left for future connections (tees, stubs, etc.,) unless they are in a valved zone, or can be isolated by existing valves with minor loss of pipe contents when opened

All general duty plumbing valves shall meet the requirements set forth:

- Ball Valves
  - System supply and return piping shut-off and isolation valves for application in piping system up to and including 2-1/2” in diameter
  - Class 125, bronze body, screw-in bonnet, integral seat, renewable disc, straight body
- Butterfly Valves
  - System supply and return piping shut-off and isolation valves for application in piping system over 2-1/2” in diameter
  - 6 Inches and Smaller: 200 PSI, ductile iron body, extended neck, aluminum bronze disc, reinforced resilient EDPM seat, manual lever and lock
  - 8 Inches and Larger: 200 PSI, ductile iron body, extended neck, aluminum bronze disc, reinforced resilient EDPM seat, gear operator
- Globe Valves
  - Design for modulating services
  - 2 Inches and Smaller: Class 125, bronze body, screw-in bonnet, integral seat, renewable disc, straight body
  - 2-1/2 Inches and Larger: Class 125, iron body, bolted bonnet, flanged ends, renewable seat and disc, bronze mounted
- Balancing Valves
  - Provide balancing valves as required for proper balance and to maintain balance at part and full load conditions
  - Bronze with a machined orifice flow restriction, multi-turn globe type valve, internal O-rings, rated working pressure of at least 240 PSIG (175 PSI iron construction, 2-1/2 inches and larger), flow setting indicating pointer and calibrated nameplate, memory stops, and pressure readout port with integral check valve on each side of the orifice
- Check Valves
  - Where check valves are required, they shall be installed on the equipment side of all shutoff valves to facilitate servicing of the check valve

  - 2 Inches and Smaller: Class 125, bronze body, horizontal swing, regrinding type, Y-pattern, renewable disc
  - 2-1/2 Inches and Larger: Class 125, iron body, bolted bonnet, horizontal swing, renewable seat and disc, flanged ends
- Drain Valves
  - Class 125, bronze body, screw-in bonnet, rising stem, composition disc, 3/4-inch hose outlet

Approved Manufacturers:

- Ball, Butterfly, Globe Valves, Check Valves, Drain Valves
  - Nibco
  - Crane
  - Milwaukee
- Balancing Valves
  - Bell & Gossett
  - Armstrong
  - Nibco
  - Wheatley
  - Tour & Anderson

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

DESIGN STANDARD for Hangers and Supports for Plumbing Piping and Equipment

Purpose:

The plumbing piping and equipment hangers are an essential element of the plumbing systems. This design standard has the purpose of creating a consistent application of plumbing piping and equipment hanger requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Material and installation of supports, anchors and sleeves including: horizontal piping hangers and supports; vertical piping clamps; hanger rod attachments; building attachments; saddles and shields; miscellaneous metals, miscellaneous materials; roof equipment supports; anchors; equipment supports; wall and floor sleeves; and escutcheon plates for a complete and operable systems.

- Design pipe hangers and supports whose materials, design and manufacture comply with MSS SP-58, "Pipe Hangers and Supports - Materials, Design and Manufacture," latest edition.
- Select and apply pipe hangers and supports complying with MSS SP-69, "Pipe Hangers and Supports - Selection and Application," latest edition. Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper-plated hangers and supports for un-insulated copper piping systems.
  - Pipe Hangers Size 2 Inches and Smaller: Adjustable swivel ring hanger, UL listed
  - Pipe Hangers Size 2-1/2 Inches and Larger: Adjustable clevis type, UL listed
- The use of pipe hooks, chains, plumbers tape, or perforated iron for pipe supports is not acceptable
- All piping shall be designed to maintain the required pitch and shall provide for proper expansion and contraction
- Vertical runs of pipe shall be supported with steel, UL listed riser clamps made specifically for pipe or for tubing

- Due to the harsh outdoor environment at Solano College, all piping supports at Solano College that are in contact with the outdoor air shall be protected against corrosion.
- Piping supports shall be designed to withstand seismic forces.
- Roof equipment supports: Coordinate the location and type of each roof equipment support with the roofing system supplier. Coordinate systems to maintain roof warranty. Due to Solano College's harsh outdoor environment all exposed equipment supports or equipment supports in mechanical rooms with contact to the outdoor air shall be protected against corrosion.
  - Compensate for slope in roof so top of support is level
  - Construct curb to withstand seismic forces
- Roof Pipe Supports: Support piping on roof with polyethylene high-density U.V. resistant quick "pipe" block with foam pad. Recommended installation is for quick "pipe" blocks to be freestanding. Piping 3 inch and larger mounted on roller hangers. Wood block supports are not acceptable due to increased maintenance and low reliability.
- Escutcheon Plates: Design around horizontal and vertical piping at visible penetrations through walls, partitions, floors, or ceilings, including penetrations through closets, through below ceiling corridor walls, and through equipment room walls and floors.

Approved Manufacturers:

- Pipe Hanger Supports
  - B-Line
  - Michigan
  - Superstrut
  - Unistrut
- Roof Equipment Supports
  - Pate ES
  - Custom Curb
  - Vibrex
  - Thycurb
- Roof Pipe Supports
  - Erico Pipe Piers
  - Nelson-Olsen Inc.

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 22 11 13 – GENERAL PLUMBING PIPING SYSTEMS

DESIGN STANDARD for Vibration and Seismic Controls for Plumbing Piping, and Equipment

Purpose:

The vibration and seismic controls for plumbing piping and equipment is an essential element of the plumbing systems. This design standard has the purpose of creating a consistent application of vibration and seismic control requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials and installation of seismic restraint devices, vibration isolation systems, and related items for complete and operable systems.

- Vibration Control
  - Mechanical and electrical equipment and associated piping shall be mounted by vibration isolators as required to minimize transmission of vibrations and noise to building structures or spaces.
  - Selection of isolator type shall be as given in Table 42, Selection Guide for Vibration Isolation, Chapter 47, “Sound and Vibration Control,” of the latest edition of the ASHRAE Applications Handbook.
  - All rotating equipment shall be balanced both statically and dynamically. Vibration shall not exceed the guidelines given in Table 42, Selection Guide for Vibration Isolation, Chapter 47, “Sound and Vibration Control,” of the latest edition of the ASHRAE Applications Handbook.
  - To minimize alignment problems, all motors over 5 hp must be designed to be solidly attached to a common base with the driven unit.
  - In order to minimize vibration, solid sheaves and band belts shall be designed to be used in multiple V-belt driven equipment over 15 hp.
- Isolation Equipment
  - Isolation shall be designed to be stable during starting and stopping of equipment without any transverse and eccentric movement of equipment that would damage or adversely affect operation of the equipment or appurtenances.
  - Isolation shall be designed for the operating speed of the equipment.
  - Isolators, including springs, exposed to the weather shall be hot dipped galvanized after fabrication. Hot dipped zinc coating shall comply with ASTM Method A-123 and shall not be less than 2 oz per square foot. Isolators at the Solano campus shall not be designed to be exposed to the environment, if absolutely impossible; the isolators will be required to have extra corrosion protection. A request to install isolators exposed to the elements shall be submitted to Solano Community College District.
  - Isolators shall be selected and located to produce uniform loading and deflection even when equipment weight is not evenly distributed.
  - Isolation equipment includes: neoprene pads, hanger spring and neoprene, travel limited floor spring and neoprene, inertia base, flexible pipe connections, thrust limits, grommets, and snubbers.
- Seismic Control and Restraint
  - Brace or anchor plumbing equipment to resist horizontal forces acting in any direction using the CBC latest edition.
  - Provide factory fabricated seismic restrained vibration isolating components. Earthquake resistant designs for equipment to conform to the regulations of the CBC, latest edition. It is the Districts desire to use standard factory fabricated components, if they are not available, provide properly designed custom components which meet the requirements herein.
  - Design shall include earthquake bumpers to prevent excessive motion during starting and stopping of equipment and for earthquake bracing. Install bumpers after equipment is in operation to allow proper placement and alignment and ensure that bumpers are not engaged during normal system operation
  - Design the seismic bracing and anchorage of piping per Section 22 05 29
  - Design piping and ductwork seismic restraints using the document "Seismic Restraints Manual Guidelines for Mechanical Systems." Secure piping, ductwork, and the like to withstand a force in any direction.

- Design restraints to meet CBC Seismic Restraint requirements. Provide structural engineering calculations sealed by a professional engineer registered in state of California.

- Seismic Pipe Loops and Pipe Expansion
  - The design shall examine the piping system and shall design expansion compensation into the system by use of expansion loops, flexible connectors or, where space is limited, self-aligning bellows-type expansion joints.
  - The design shall design all anchors and guide supports as needed.
  - Seismic connectors for straight pipe runs to be designed with sufficient live length on each flexible leg to provide the minimum movement in directions as required by movement allowed at joint. Verify with structural total movement required in planes.

Approved Manufacturers:

- Isolation Equipment
  - Amber Booth
  - Mason
  - Vibrex
- Seismic Pipe Loops and Expansion Joints
  - Amber Booth
  - Mason
  - Metraflex
  - Vibrex

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

DESIGN STANDARD for Identification of Plumbing Piping and Equipment

Purpose:

The identification of plumbing piping equipment is an essential element of the plumbing systems. This design standard has the purpose of creating a consistent application of systems identification requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials and installation of mechanical systems identification for complete and operable systems.

- General: Adhere to ANSI A-13.1
- Piping
  - Wrap around plastic identification. Include arrows to show normal direction of flow. For hot non-insulated pipes, install a segment of pipe insulation with appropriate piping identification.
  - Locate identification as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (above removable ceilings and the like) and exterior non-concealed locations.
    - Near each valve and control device.
    - Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.
    - At locations where pipes pass through walls, floors, ceilings, or enter non-accessible enclosures.
    - At access doors, manholes and similar access points which permit view of concealed piping.
    - At major equipment items and other points of origination and termination.

        - Spaced intermediately at maximum spacing of 20’ in spaces with removable ceilings and at each access door in spaces with hard ceilings.
        - Identify non potable piping and outlets.
    - Color code piping: Fire protection – red; Gas – yellow; All others – white with appropriate identification.
- Valve Identification
    - Provide for brass valve tags on every valve cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, plumbing fixture faucets, convenience and lawn-watering hose bibs, and shut-off valves at plumbing fixtures. Rough-in connections of end-use fixtures and units. List each tagged valve in a valve schedule for each piping system.
- Plumbing Equipment Identification
    - Provide for engraved plastic laminate sign on or near each major item of plumbing equipment and each operational device. Provide signs for the following general categories of equipment and operational devices:
        - Main control and operating valves, including safety devices.
        - Meters, gauges, thermometers and similar units.
        - Fuel-burning units including boilers, furnaces, and heaters.
        - Pumps, compressors, chillers, condensers and similar motor-driven units.
        - Heat exchangers, coils, evaporators, cooling towers, heat recovery units and similar equipment.
        - Fans, blowers, primary balancing dampers and VAV boxes.
        - HVAC central-station and zone-type units.
        - Tanks and pressure vessels.
        - Air conditioning indoor and outdoor units.
        - AFD's and transmitters and Control Boxes.

Approved Manufacturers:

- Seton
- Brady

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

DESIGN STANDARD for Insulation of Plumbing Piping and Equipment

Purpose:

The plumbing systems insulation is an essential element of the plumbing systems. This design standard has the purpose of creating a consistent application of insulation requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials and installation of insulation, jackets and accessories for a complete and operable system.

- General:
  - Adhere to the requirements of the California Energy Code – Title 24, latest edition.
  - Insulation shall be applied on clean, dry surfaces and only after tests and approvals required by the specifications have been completed.
  - All pipe insulation on piping operating below ambient temperature shall be continuous through wall and ceiling openings and sleeves.
  - Insulation on all cold surfaces must be applied with a continuous, unbroken vapor seal. Hangers, supports, anchors, etc., that are secured directly to cold surfaces shall be adequately insulated and vapor sealed to prevent condensation.
  - Specified adhesives, mastics, and coatings shall be applied at the manufacturer's recommended minimum coverage per gallon.
  - Edges of vapor barrier insulation at valve stems, instrument wells, unions, and other raw edges shall be sealed adequately to prevent moisture from penetrating the insulation.
- Fire Hazard Ratings: All insulation shall have composite (insulation jacket and adhesive used to adhere the jacket to the insulation) Fire and Smoke Hazard ratings as tested under procedure ASTM E 84, NFPA 225, and UL 723.
- Insulation Protection Shields
  - To prevent crushing of insulation, insulation protection shields shall be installed at all pipe hangers and supports. Shields shall span an arc of 180°. Provide full size diameter hangers and shields (18 gauge minimum) for piping. Provide 18-inch long, non-compressible insulation section at insulation shields for lines 2 inches and larger.
- Insulation Jacketing
  - Provide aluminum jacketing for all piping located aboveground, outdoors.
- Piping
  - In general, piping systems shall be insulated with fiberglass piping insulation with an all-purpose jacket. Fittings, flanges, and valves shall be insulated with fiberglass inserts and premolded polyvinyl or PVC jackets.
  - Calcium silicate or high-temperature fiberglass shall be used in high temperature applications.
  - Special insulation protection shall be considered for areas subject to abuse and moisture, such as outside areas, washdown areas, public areas, and classrooms.
  - Removable insulated jackets shall be provided on all valves.
- Equipment: At a minimum, the following equipment shall be provided with insulation:
  - Hot water storage tanks
  - Heat exchangers
  - Flue pipe

Approved Manufacturers:

- Armacell LLC Armaflex
- Certainteed
- Johns Manville
- Knauf
- Owens-Corning Brady

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 22 05 12 - PLUMBING PIPE AND FITTINGS

DESIGN STANDARD for General Plumbing Piping Systems

Purpose:

The plumbing piping materials are an essential element of the plumbing systems. This design standard has the purpose of creating a consistent application of plumbing piping material requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, reliability, and energy efficiency throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation and testing of pipe, tubing and fittings for complete and operable systems.

- Above ground soil, waste and vent piping within buildings, including soil stacks, vent stacks, horizontal branches, traps, and connections to fixtures and drains.
- Underground building drain piping including mains, branches, traps, connections to fixtures and drains, and connections to stacks, terminating at connection to sanitary sewers 5 feet outside foundation wall.
- Storm building drain piping from conductor piping and area drains to storm sewers 5 feet outside inner face of foundation wall.
- Domestic cold water piping.
- Domestic hot water piping.
- Domestic re-circulating water piping.
- Schedules:

Pipe Service	Location	Material
Potable hot, cold and hot recirculation water.	Above ground	Copper: L
Potable hot, cold, and hot recirculation water	Below ground	Copper: K

Pipe Service	Location	Material
Soil and waste, drainage	Above ground	CISP: No hub or service weight
Soil and waste, drainage	Below ground	CISP: No hub or service weight
Vents	Above and below ground	CISP: No hub
Storm drains	Above ground	CISP: No hub or service weight
Storm drains	Below ground	CISP: No hub or service weight

Approved Manufacturers:

Not Applicable

Substitutes Allowed:

Not Applicable

Associated Design Standards and Specifications

- 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT
- 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT
- 22 05 12 – PLUMBING PIPE AND FITTINGS

DESIGN STANDARD for Plumbing Equipment

Purpose:

The plumbing equipment is an essential element of the plumbing systems. This design standard has the purpose of creating a consistent application of plumbing equipment requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, water efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials and installation of water heaters, circulation pumps, storage tanks, sump pumps, grease interceptors, and accessories for a complete and operable system.

- Pumps: Design, manufacture and install pumps in accordance with HI (Hydraulic Institute Standards).
- Water Heaters: Electric, Commercial type, with minimum 5 year commercial warranty.
- Circulation Pumps: Provide in-line factory tested pumps, cleaned, and painted with enamel prior to shipment. Provide pumps of same type by same manufacturer.
- Sump Pumps: Submersible, heavy duty cast iron, float operated, visual/audible alarm/control panel.
- Grease Interceptors:
  - Prefabricated reinforced concrete grease interceptor structure in accordance with state and local agency code standards.
  - Coated cast iron grease interceptor with coated steel extension. Gasketed nonskid locking cover.
- Storage Tanks: Factory fabricated steel, glass lined, vertical tank with mounting supports.

Approved Manufacturers:

- Water Heaters (Gas, Storage)
  - Rheem, Ruud
  - A. O. Smith
  - State
  - Bradford-White
  - PVI
- Water Heaters (Gas, Instantaneous)
  - Takagi
  - A.O. Smith
  - Aerco
- Circulation Pumps
  - Amtrol
  - Armstrong
  - Bell & Gossett
  - Grundfos
  - Paco
  - Taco
- Sump Pumps
  - Paco
  - Hydromatic
  - Aurora
  - Grundfos
  - Peerless

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 22 05 12 - PLUMBING PIPE AND FITTINGS
- 22 11 13 - GENERAL PLUMBING PIPING SYSTEMS

DESIGN STANDARD for Plumbing Fixtures

Purpose:

The plumbing fixtures are an essential element of the plumbing systems. This design standard has the purpose of creating a consistent application of plumbing fixture requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, water efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials and installation of plumbing fixtures and accessories for a complete and operable system.

- Where possible consider the use of low flow fixtures and provide means of water conservation.
- Designer shall follow all requirement to meet ADA compliance for all fixtures.
- Preferred plumbing fixtures:
  - Lavatories: White, vitreous china (coordinate other finishes with Solano Community College District), hard wired sensor faucets, no more than 0.5 GPM, provide lower flow rate where deemed possible. No battery powered faucets unless solar powered.
  - Showers: Built up, tempering valve, low flow shower head.
  - Urinals (Public): White vitreous china, wall hung, water free flush cycle with automatic drain rinse every 72 hours, switch for manual rinse activation, minimum 8 year battery life.
  - Urinals (Staff): White vitreous china, wall hung, water free flush cycle with automatic drain rinse every 72 hours, switch for manual rinse activation, minimum 8 year battery life.
  - Water Closets (Public): White vitreous china, floor mount, 1.28 gpf, automatic flush valve (hardwired). Consider dual flush or ultra-low flow and coordinate use with Solano Community College District.
  - Water Closets (Staff): White vitreous china, floor mount, 1.28 gpf, automatic flush valve. Consider dual flush or ultra-low flow and coordinate use with Solano Community College District.
  - Sinks: Stainless steel, ADA sink depth, 0.5 gpm flow faucet.
  - Service sinks: Composite, floor mounted, faucet with hose adapter, mop holder over service sink.
  - Hose bibbs: Interior located with loose key and vacuum breaker. Exterior shall be non-freeze type. Provide hose bibs in each restroom.
  - Drains: Nickel bronze floor drains with trap primer. Provide drains in all restrooms.
  - Emergency showers/eyewash: Tempered water supply, provide drained system. Provide test valve.
  - Drinking fountains: No cooling, stainless steel construction, dual height for ADA compliance.
  - Water Bottle Filling Stations: No cooling, stainless steel construction, ADA compliant, provide at each set of drinking fountains.
  - Replacement faucets: Hard wired sensor faucets, no more than 0.5 GPM, provide lower flow rate where deemed possible, match existing lavatories and/or sinks. No battery powered faucets unless solar powered.

Approved Manufacturers:

- Lavatories: Kohler, American Standard, Eljer
- Showers: Moen, Kohler, American Standard
- Urinals: Sloan
- Water closets: Kohler, American Standard, Eljer, Zurn
- Sinks: Kohler, American Standard, Eljer
- Service sinks: Kohler, American Standard, Eljer
- Hose bibbs: Woodford, Nibco, Chicago
- Drains: JR Smith, Zurn, Josam
- Emergency showers/eyewash: Guardian, Viking, Haws
- Roof drains: JR Smith, Zurn, Josam
- Floor drains: JR Smith, Zurn, Josam

- Floor Sinks: JR Smith, Zurn, Josam
- Drinking Fountains: Elkay
- Water Bottle Filling Stations: Elkay
- Automatic Valves: Sloan
- Lav Faucets: Speakman
- Sink Faucets: Chicago

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 22 11 13 - GENERAL PLUMBING PIPING SYSTEMS
- 22 00 00 - BASIC PLUMBING SYSTEM DESIGN

End of Document

Plumbing Fixtures

L-1: Lavatory: American Standard Declyn Model 0321, 18-1/2" wide x 17" long, white vitreous china, wall mount lavatory with perforated grid drain and tailpiece for ADA compliance and Speakman model S-8801 hard wired sensor faucet, lead free, 0.50 gpm.

SK-I: Sink: Just Model SL-ADA-1921-A-GR, 19" wide x 21" long x 5-1/2" deep, stainless steel, counter mount sink with J-ADA-35 crumb cup strainer and tailpiece for ADA compliance and Chicago model 786-E2805-5ABCP gooseneck faucet with wrist blade handles, lead free, 0.5 gpm.

WC-I: Water closet: American Standard Model Madera 3461.712, white vitreous china, siphon jet, elongated-bowl;-floor-mount;-Flus!Tvalvewith-hard-wire·d-infrared-sensor-C-l.28-gallons·per flush), white open front seat (less cover), ADA compliant, water hammer arrestor.

UR-I: Urinal: Sloan Hybrid (HYB-1000), white vitreous china, wall mount, automatic drain rinse, ADA compliant

SH- I: Shower: Moen model T8346EP15 Chrome plated single handle posi-temp handheld shower system with Moen model 8371 mixing valve (l .5 gpm). ADA compliant.

MSK-1: Mop Sink: Stern Williams Corlow model SBC-1700 24"x24"x12" with 6" drop front corner, stainless steel cap on threshold, cast brass drain with stainless steel strainer, mop hanger and Chicago model 897-CP faucet with integral stops, top brace,%" hose thread on spout with pail hook, vacuum breaker, 832-AA 30 inch long, heavy duty 5/8" cloth reinforced rubber hose and 18 gauge 304 stainless steel hose bracket with rubber grip.

FS-1: Floor sink: Zurn model ZI 900 12"xl 2"x6" with acid resistant coating, flange strainer & trap primer.

FD-I: Floor drain: Zurn model FD-23215 2" cast iron body, adjustable bronze strainer head & trap primer.

SHD-1: Shower Drain: Zurn model FD225 l-CI 2" cast iron body, strainer and trap primer.

DF-1 and WBF-1: Water Bottle Filling Station and Bi-Level Drinking Fountain: Elkay model LZSTLDDWSSK, light gray granite finish, filter certified to NSF42 and 53 for lead, class 1 particulate, chlorine, taste and odor reduction, Green Ticker, hands-free, laminar flow for minimal splash, real drain, ADA complaint.

American Standard
Style That Works Better

BARRIER FREE

L-1

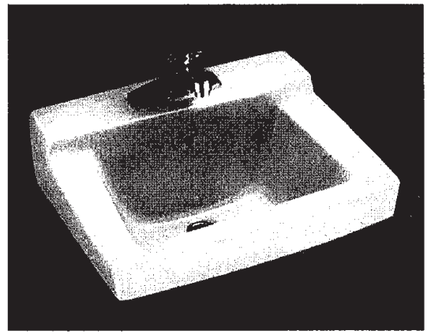
DECLYN™ WALL-HUNG LAVATORY
VITREOUS CHINA

DECLYN™ WALL-HUNG LAVATORY

- Wall-hung sink
- Vitreous china
- Rear overflow
- Soap depression
- Faucet ledge
  Shown with 2000.101 Ceramix faucet (not included)

❑ **0321.026** With wall hanger (Illustrated)
Faucet holes on 102mm (4") centers

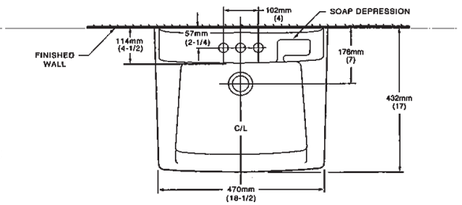
❑ **0321.075** For concealed arms support ←
Faucet holes on 102mm (4") centers

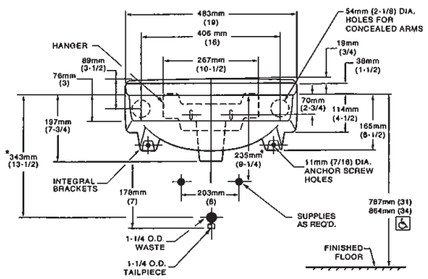


Nominal Dimensions:
470 x 432mm
(18-1/2" x 17")

Bowl sizes:
362mm (14-1/4") wide
273mm (10-3/4") front to back
152mm (6") deep

Compliance Certifications -
Meets or Exceeds the Following Specifications:
• ASME A112.19.2 for Vitreous China Fixtures





To Be Specified:
❑ Color: ❑ White ❑ Bone ❑ Silver
❑ Faucet*:
❑ Faucet Finish:
❑ Supplies:
❑ 1-1/4" Trap:
❑ Nipple:
❑ Concealed Arms Support (by others):

* See faucet section for additional models available

MEETS THE AMERICANS WITH DISABILITIES ACT GUIDELINES AND ANSI A117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES - CHECK LOCAL CODES.
Top of front rim mounted 864mm (34") from finished floor.

NOTES:
* DIMENSIONS SHOWN FOR LOCATION OF SUPPLIES AND "P" TRAP ARE SUGGESTED.
PROVIDE SUITABLE REINFORCEMENT FOR ALL WALL SUPPORTS.
FITTINGS NOT INCLUDED AND MUST BE ORDERED SEPARATELY.

IMPORTANT: Dimensions of fixtures are nominal and may vary within the range of tolerances established by ANSI Standard A112.19.2. These measurements are subject to change or cancellation. No responsibility is assumed for use of superseded or voided pages.

SPEAKMAN®

400 Anchor Mill Rd., New Castle, DE 19720, USA
L-1
800-537-2107 | Fax: 800-977-2747
www.speakmancompany.com

SENSORFLO®

AC Powered Lavatory Faucet ♿

S-8800
S-8801

S-8810
S-8811

S-8820
S-8821

GENERAL SPECIFICATION

Polished chrome plated. Solenoid with built-in filter. UL/CSA approved transformer 120 VAC to 12 VDC with waterproof connectors. Spout consists of all metal chassis and removable cover. Vandal-resistant 60-second time out feature. Water conserving vandal-resistant flow control reduces flow to 1.5 gpm/5.7 L/min. To meet existing ASME A112.18.1/CSA B125.1 and WaterSense standards.
NOTE: Stainless steel flexible supply hose(s), 3/8" compression, to supply stop(s) not included, see options below.

S-8800
SIngle basin, low profile faucet.

S-8801
Single basin, low profile faucet, under counter mechanical mixer with built-in backflow check valves.

S-8810
Low profile faucet with 4" deck plate.

S-8811
Low profile faucet with 4" deck plate, under counter mechanical mixer with built-in backflow check valves.

S-8820
Low profile faucet with 8" deck plate.

S-8821
Low profile faucet with 8" deck plate, under counter mechanical mixer with built-in backflow check valves.

OPTIONS

SUFFIX	DESCRIPTION
→ BO	0.5 gpm flow control, vandal-resistant
→ CA**	No lead for CA AB1953 compliance
HS	Two (2) stainless steel flexible supply hoses to supply stops
HTS	One (1) stainless steel hose for tempered water systems (S-8800, S-8810, & S-8820 only)
LF	1.5 gpm laminar flow control outlet
LT	Less transformer
TMV-CA	Under counter thermostatic mixing valve (S-8800, S-8810, & S-8820 only)
VRS	Vandal-resistant screws for removable cover and custom wrench

** The following options are not available with the "CA" option:
HS (Hose & Sprayt, SO, TWI, VB6, VB8, ST, SW, & TMV.

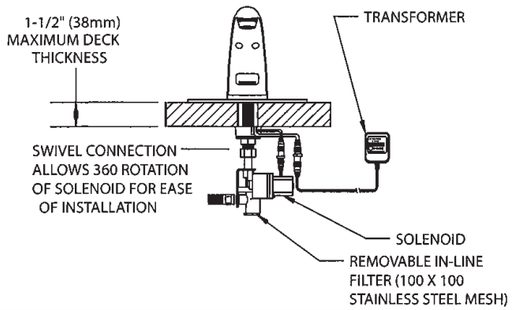
This space for Architect/Engineer approval.

Management Systems Registered to ISO 9001

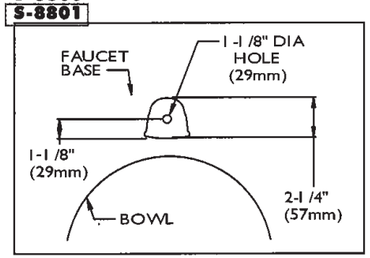
SPEAKMAN®

400 Anchor Mill Rd., New Castle, DE 19720, USA
800-537-2107 | Fax: 800-977-2747
www.speakmancompany.com

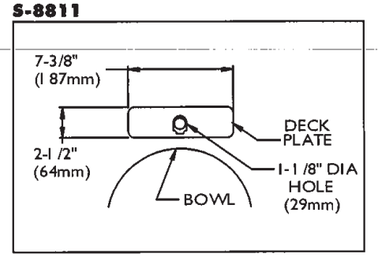
Rough-Ins

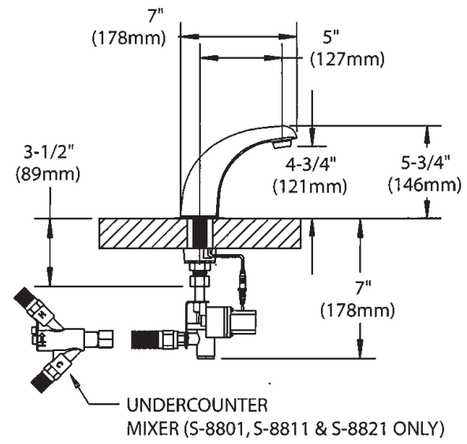


S-8800
S-8801

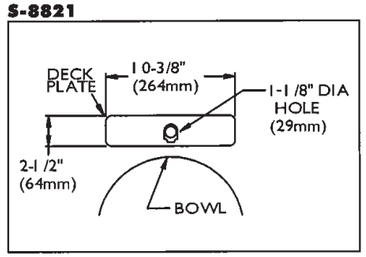


S-8810
S-8811





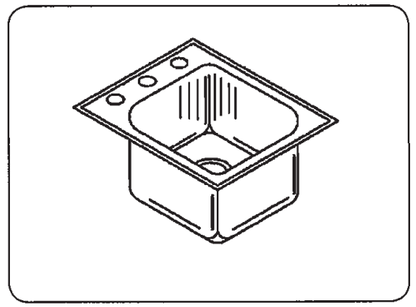
S-8820
S-8821

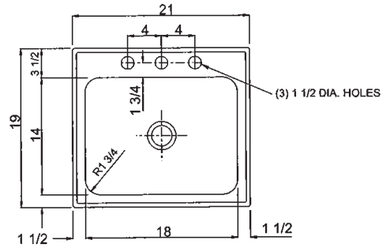


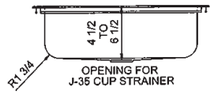
NOTE: Position faucet as close to the edge of the sink as possible. Ensure adequate clearance for wire protector, wires, washers and nut. Unless otherwise specified, all inlets are 3/8 compression with male threads. Unless otherwise specified, all dimensions are in inches and are subject to change without notice.

SK-1 **SL-ADA-1921-A-GR**

STYLIST GROUP
LEDGE TYPE - SINGLE BOWL
18 GAUGE







SPECIFICATION

Seamless die-drawn construction of Type 304, 18-8 stainless steel. Interior and top surfaces polished to a non-porous Hand-Blended Just Finish with highlighted bowl rim. Fully coated underside insulated for sound and reduces condensation. Straight-sided compartment with radius corners provides greater capacity. Self-rimming top mount Grip-Rim Plus with stainless steel mounting channels. Conforms to ASME/ANSI A112.19.3M. Certified conformance with ASME A112.19.3/CSA B45.4, Canadian Standards (CSA), Uniform Plumbing Code (UPC) and International Plumbing Code (IPC) and Americans with Disabilities Act(ADA). Drain punch 3-1/2" centered for Just J-35 drain.

☐ **TYPE 316 STAINLESS STEEL** (Check if applicable)

CUTOUT DIMENSIONS		
Model Number	Front-to-Back	Left-to-Right
SL-ADA-1921-A-GR	18-1/4	20-1/4

FAUCET PUNCHING - MUST BE SPECIFIED	
☐	(1) Hole Centered
☐	(2) Holes on 4" centers
☐	(3) Holes on 4 "centers(illustrated)
☐	Alternate Punching: Faucet Model: Punching Required:

DEPTH - MUST BE SPECIFIED:					
☐ 4 1/2" DEEP	☐ 5" DEEP	☑ 5-1/2" DEEP	☐ 6" DEEP	☐ 6-1/2" DEEP	

DRAIN LOCATION - MUST BE SPECIFIED:				
☐ CENTER	☐ CENTER REAR	☐ LEFT REAR	☐ RIGHT REAR	

APPROVED FOR MANUFACTURING

MODEL NO.: SL-ADA-1921-A-GR QTY: _____

JOB NAME: SCC Bldg 600

TAG/ITEM: SK-1

CUSTOMER: _____

SIGNATURE: _____

MADE IN U.S.A.

JUST MANUFACTURING COMPANY
9233 KING STREET . FRANKLIN PARK . ILLINOIS . 60131-2111
PH: 847-678-5150 . FAX: 847-678-6817 . E-MAIL: custserv@justmfg.com . www.justmfg.com

SUBMITTAL DATA

MECHANICAL FAUCETS

786-E2805-5ABCP

SK-1

CHICAGO FAUCETS
a Geberit company

Manual and Metering Faucets

Product Type

Deck Mounted 8" Fixed Centers Concealed Hot and Cold Water Sink Faucet

Features & Specifications

- 8" Fixed Centers
- 5-1/4" Rigid / Swing Gooseneck Spout
- 0.5 GPM (1.9 L/min) Vandal Proof Non-Aerating Spray Outlet
- 4" Wristblade Handle
- Quaturn Compression Operating Cartridge
- 1/2" NPSM Supply Inlets and Coupling Nut for 3/8" or 1/2" Flexible Riser
- ECAST® design provides durable brass construction with total lead content equal to or less than 0.25% by weighted average
- CFNow! Item Ships in 5 Days

Job Name _____

Item Number _____

Section/Tag _____

Model Specified _____

Architect _____

Engineer _____

Contractor _____

[ ] Submitted as Shown [ ] Submitted with Variations

Date _____

Performance Specification

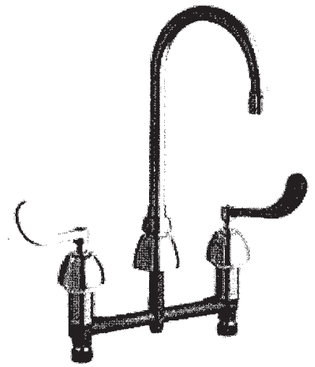
- Rated Operating Pressure: 20-125 PSI
- Rated Operating Temperature: 40-140°F

Warranty

- Lifetime Limited Faucet Warranty
- 5-Year Limited Cartridge Warranty
- 1-Year Limited Finish Warranty

Codes & Standards

- ASME A112.18.1/CSA B125.1
- Certified to NSF/ANSI 61, Section 9 by CSA
- California Health and Safety Code 116875 (AB1953-2006)
- Vermont Bill S.152
- NSF/ANSI 372 Low Lead Content
- ADA ANSI/ICC A117.1
- CALGreen



ECAST

ECAST products are intended for installation where state laws and local codes mandate lead content levels or in any location where lead content is a concern.

2100 South Clearwater Drive
Des Plaines, IL
P: 847/803-5000
F: 847/803-5454
Technical: 800/TEC-TRUE
www.chicagofaucets.com

Last Revision: 03/25/2013 • Date Printed: 09/4/2013 • Product specifications subject to change without notice

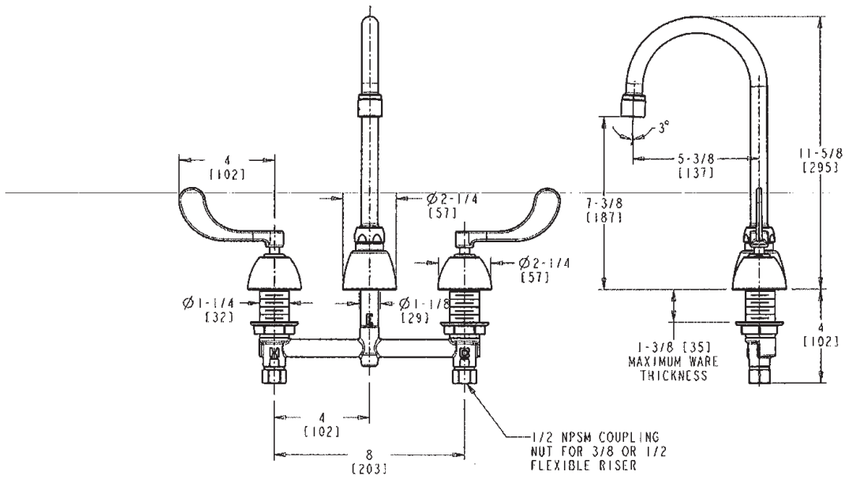
786-E2805-5ABCP

Manual and Metering Faucets

CHICAGO FAUCETS
a Geberit company

Architect/Engineer Specification

Chicago Faucets No. 786-E2805-5ABCP, Deck Mounted 8" Fixed Centers Concealed Hot and Cold Water Sink Faucet, Chrome Plated solid brass construction. 5-1/4" Center to Center Rigid / Swing Gooseneck Spout. 0.5 GPM (1.9 L/min) Vandal Proof Non-Aerating Spray Outlet. 4" Metal Wristblade handle(s) with Sixteen Point Tapered Broach and Secured Blue and Red Buttons. Quaturn™ rebuildable compression cartridge, opens and closes 90°, closes with water pressure, features square tapered stem. 1/2" NPSM Supply Inlets and Coupling Nut for 3/8" or 1/2" Flexible Riser. ECAST® construction with less than 0.25% lead content by weighted average. CALGreen Compliant. This product meets ADA ANSI/ICC A117.1 requirements and is tested and certified to industry standards: ASME A112.18.1/CSA B125.1, Certified to NSF/ANSI 61, Section 9 by CSA, California Health and Safety Code 116875 (AB1953-2006), Vermont Bill S.152, NSF/ANSI 372 Low Lead Content, and California Green Building Standards Code (CALGreen).



Operation and Maintenance

Installation should be in accordance with local plumbing codes. Flush all pipes thoroughly before installation. After installation, remove spout outlet or flow control and flush faucet thoroughly to clear any debris. Care should be taken when cleaning the product. Do not use abrasive cleaners, chemicals or solvents as they can result in surface damage. Use mild soap and warm water for cleaning and protecting the life of Chicago Faucet products. For specific operation and maintenance refer to the installation instructions and repair parts documents that are located at www.chicagofaucets.com.

Chicago Faucets, member of the Geberit Group, is the leading brand of commercial faucets and fittings in the United States, offering a complete range of products for schools, laboratories, hospitals, office buildings, food service, airports and sport facilities. Call 1.800.TECTRUE or 1.847.803.5000 Option 1 for installation or other technical assistance.

2100 South Clearwater Drive
Des Plaines, IL
P: 847/803-5000
F: 847/803-5454
Technical: 800/TEC-TRUE
www.chicagofaucets.com

Last Revision: 03/25/2013 • Date Printed: 09/4/2013 • Product specifications subject to change without notice

American Standard
Style That Works Better
BARRIER FREE

WC-1

MADERA™ FloWise® 16-1/2" HIGH 1.28 GPF FLUSHOMETER TOILET SYSTEM

with EVERCLEAN®
SELECTRONIC® EXPOSED AC FLUSH VALVE

MADERA™ FloWise® 16-1/2" HIGH 1.28 GPF FLUSHOMETER TOILET SYSTEM with EVERCLEAN®

❑ **3461.712** 1.28 gpf 16-1/2" High Top Spud Bowl and Selectronic® Exposed AC Flush Valve ←

BOWL:
- Floor mount elongated flushometer valve toilet
- Vitreous china
- High Efficiency, Low Consumption. Operates in the range of 1.1 gpf to 1.6 gpf (4.2 Lpf to 6.0 Lpf)
- Permanent EverClean® surface inhibits the growth of stain- and odor-causing bacteria, mold, and mildew on the surface
- 16-1/2" rim height for accessible application
- Powerful direct-fed siphon jet action
- Fully glazed 2-1/8" trapway
- Condensation channel
- 10" or 12" rough-in
- 10" x 12" water surface area
- 1-1/2" inlet spud
- 100% factory flush tested
- Less toilet seat
- Model 3461.001

SELECTRONIC® FLUSH VALVE:
- Electronic flush valve with Selectronic® proximity system for hygienic "Hands Free" operation
- Self-Cleaning Piston with integral wiper spring helps prevent clogging and reduces maintenance
- Piston operation delivers superior flush accuracy and repeatability
- Fully Mechanical Manual Override - allows valve to flush during a power failure
- Fail-Safe Operation - valve automatically closes, and does not need to be reset, on loss of power or water pressure
- Adjustable Sanitary Flush - valve automatically flushes after 24 hours of non-use to clean fixture and maintain trap seal
- Chemical resistant EPDM seals are unaffected by chloramines
- Sensor & electronic controls are fully enclosed and water resistant
- Range can be adjusted manually or with optional remote control
- Includes UL approved hardwired AC transformer
- Input Voltage: 100 - 250 VAC, 50 / 60 Hz. Output Voltage: 6 VDC
- Adjustable tailpiece for rough-in flexibility
- Can be installed left or right hand
- Model 6067.121.002

Includes:
- 047007-0070A Inlet Spud (furnished with bowl)
- 481310-100 2 Bolt caps with retainers (furnished with bowl)
- Inlet includes 1" I.P.S. angle stop with back-flow protection, and vandal-resistant cap
- 1" Sweat solder kit, cover tube and wall flange
- Outlet includes 1-1/2" vacuum breaker with spud coupling and flange

SEE REVERSE FOR ROUGHING-IN DIMENSIONS

High-Efficiency Toilet System
- 20% water savings when compared to 1.6 gpf toilet systems

System MaP Score:
- 1000 grams of miso @ 1.28 gpf

Operating Pressure:
Overall Range: 20-125 psi**
Recommended: 25 psi (flowing)-80 psi (static)
** Water pressure over 80 psi is not recommended for most plumbing fixtures.

Flow Requirement:
25gpm (94.6 L/min.)

Nominal Fixture Dimensions:
718 x 356 x 419mm (28-1/4" x 14" x 16-1/2")

To Be Specified:
❑ Color: ❑ White
❑ Seat:
- ❑ American Standard #5901.100 Heavy duty open front less cover
- ❑ American Standard #5905.100 Extra heavy duty open front less cover

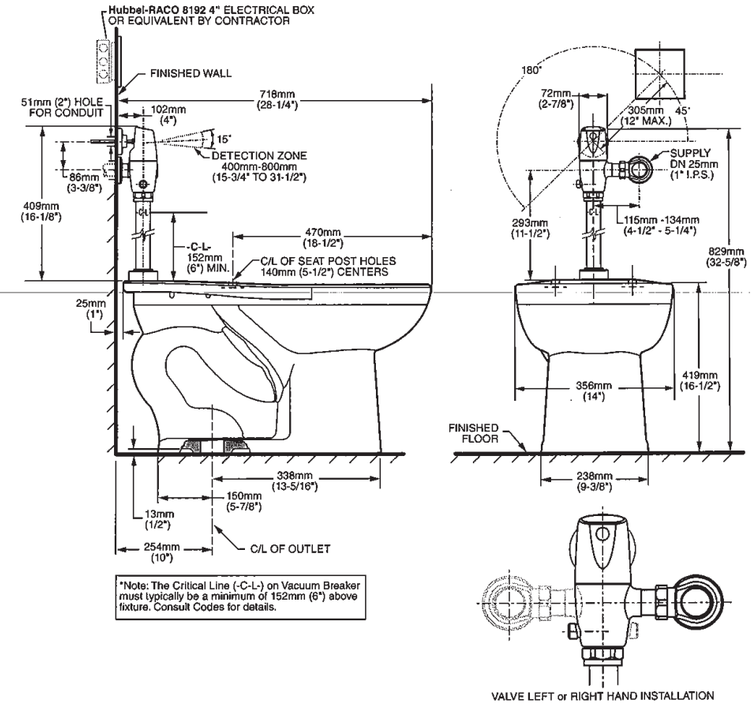
EVERCLEAN® Surface — WATER EFFICIENT PRODUCT

American Standard
Style That Works Better
BARRIER FREE

MADERA™ FloWise® 16-1/2" HIGH 1.28 GPF FLUSHOMETER TOILET SYSTEM
with EVERCLEAN®
SELECTRONIC® EXPOSED AC FLUSH VALVE

Fixture Compliance Certifications - Meets or Exceeds the Following Specifications:
- ASME A112.19.2-2008 / CSA B45.1-08 for Vitreous China Fixtures

Valve Listings:
- ASSE 1037
- ANSI/ASME A112.19.2
- ADA Compliant



*Note: The Critical Line (-C-L-) on Vacuum Breaker must typically be a minimum of 152mm (6") above fixture. Consult Codes for details.

VALVE LEFT or RIGHT HAND INSTALLATION

MEETS THE AMERICANS WITH DISABILITIES ACT GUIDELINES AND ANSI A117.1 REQUIREMENTS FOR ACCESSIBLE AND USABLE BUILDING FACILITIES - CHECK LOCAL CODES.

NOTES:
TO COMPLY WITH AREA CODE GOVERNING THE HEIGHT OF VACUUM BREAKER ON THE FLUSHOMETER VALVE, THE PLUMBER MUST VERIFY DIMENSIONS SHOWN FOR SUPPLY ROUGHING.
THIS TOILET DESIGNED TO ROUGH-IN AT A MINIMUM DIMENSION OF 254MM (10") AND A MAXIMUM DIMENSION OF 305MM (12") FROM FINISHED WALL TO C/L OF OUTLET.

IMPORTANT: Dimensions of fixtures are nominal and may vary within the range of tolerances established by ANSI Standard A112.19.2. These measurements are subject to change or cancellation. No responsibility is assumed for use of superseded or voided pages.

Sloan Standard Urinal
Model HYB-1000

▶ Code Number
1001020

▶ Description
Complete Vitreous China Hybrid Urinal with automatic drain rinse.

▶ Flush Cycle
Waterfree operation

▶ Specifications
- Urinal Assembly
- Complete mounting kit included
- Jetrinse™ Assembly

Patented housing and drain line rinsing

Automatic activation injects 1 gallon of water through housing and drain line every 72 hours to prevent struvite build-up and clogs

IR switch for manual rinse activation

Long life lithium battery provides at least 8 years of service

- Cartridge Assembly*

Enhance patented design maximizes operational life, prevents accidental sealant loss and virtually eliminates odor

Biodegradable sealant liquid

Vandal resistant locking design

20% less plastic than previous designs

Provides average of 7,000 uses that saves up to 40,000 gallons of water each year

* Replacement cartridges sold separately

▶ Features
- Patented drain rinsing assembly

Minimizes cleaning effort

Virtually eliminates odor

- Touch-free hygenic operation
- Earns maximum LEED credits
- Up to 5 times cleaner than conventional flush urinals
- Best in class odor control

IMPORTANT-Do not install on copper DWV due to copper's susceptibility to corrosion.

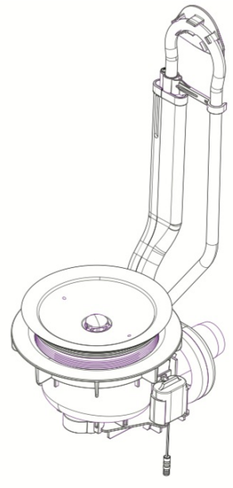
▶ Compliance & Certifications

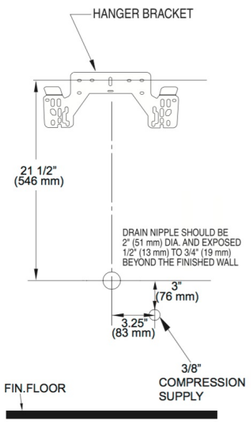
This space for Architect/Engineer Approval

Featuring FALCON WATERFREE TECHNOLOGIES

Sloan Standard Urinal
Model HYB-1000

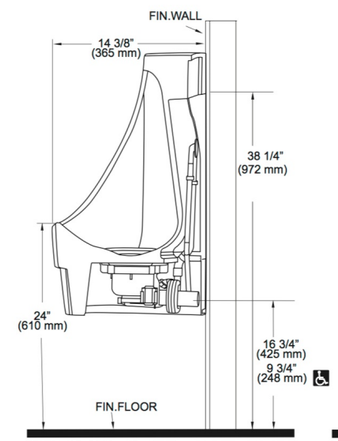
Housing and Jetrinse™ Assembly



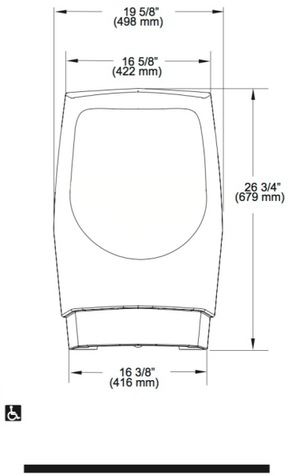


ROUGH-IN AND BRACKET LOCATION

NOTE: All vitreous china dimensions shown in these drawings are nominal. Dimensions can vary within the tolerances established in the governing ASME A112.19.2/CSA B45.1 standard. Please take this into consideration when planning rough-in and plumbing layouts.



SIDE VIEW



FRONT VIEW

MOEN®

COMMERCIAL

SH-1

Specifications

DESCRIPTION
- Metal and brass construction with Chrome plated finish, also in Classic Brushed Nickel (CBN) finish
- Pressure balancing cycle valve
- Contains: hand-held shower, with non-positive pause, 30" slide bar, drop ell, vacuum breaker, 69" metal hose and mounting hardware
- **Slide bar is NOT DESIGNED TO BE A GRAB BAR**
- Supplied with vandal resistant screws
- Quick cleaning rubber nozzles

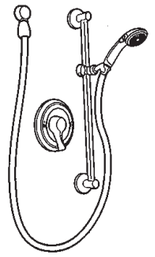
OPERATION
- Temperature valve has ADA compliant lever style handle
- Handle operates counterclockwise through a 270° arc with off at 6 o'clock, and maximum hot at the 9 o'clock position. Shut off in clockwise direction
- Adjustable temperature limit stop
- Pressure balancing mechanism maintains selected discharge temperature to ± 3.6°
- Single function spray pattern
- Easy to operate pause button (reduces the flow of water to a trickle)

FLOW
- ☐ **T8346** (2.5gpm/9.5 lpm) - Chrome finish
- ☐ **T8346CBN** (2.5gpm/9.5 lpm) - CBN finish
- ☐ **T8346EP15** (1.5gpm/5.7 lpm) - Chrome finish; **WaterSense® Certified** ←
- ☐ **T8346EP15CBN** (1.5gpm/5.7 lpm) - CBN finish; **WaterSense® Certified**

CARTRIDGE
- Pair with a brass Posi-Temp rough-in valve:
- 8370HD*: 1/2" CC connection without integral stops
- 8371HD*: 1/2" CC connection with integral stops
- 8372HD*: 1/2" IPS connection with integral stops
- 8373HD*: 1/2" PEX connection with integral stops
- 8374HD*: 1/2" CPVC connection with integral stops
- 8375HD*: 1/2" UPONOR connection with integral stops
  *Includes the 1222HD Brass Posi-Temp Cartridge
- Accommodates back to back installations

STANDARDS
- Third party certified to WaterSense® (only applies to 1.5 gpm) ASME A112.18.1/CSA B125.1 and all applicable requirements referenced therein
- **ADA** for lever handle

WARRANTY
- Warranted for 5 years against material or manufacturing defects

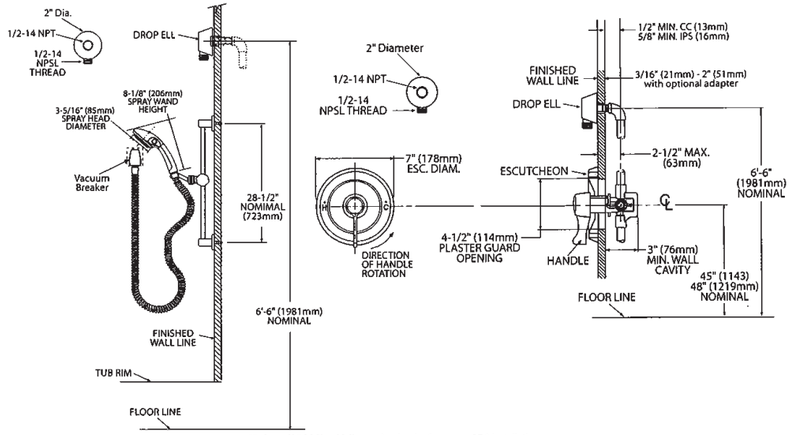


Single-Handle Posi-Temp Handheld Shower System

Model: T8346, T8346CBN

WaterSense Labeled by EPA Criteria

BUY AMERICAN ACT COMPLIANT



*Refer to (ADAAG) guidelines or local codes for proper ADA installation.

CRITICAL DIMENSIONS

(DO NOT SCALE)

Rev. 11/12

MOEN SPECIFIER SERVICES 1-800-321-8809 Ext. 2158
www.moen.com

ELKAY® SPECIFICATIONS

Elkay EZH2O Bottle Filling Station & Versatile Bi-Level ADA Cooler Filtered Non-Refrigerated Stainless
Model LZSTLDDWSSK

PRODUCT SPECIFICATIONS

Elkay ezH2O® Bottle Filling Station & Versatile Bi-Level ADA Cooler, Filtered Non-Refrigerated Stainless. Features shall include Hands Free, Visual Filter Monitor, Filtered, Green Ticker™, Laminar Flow, Antimicrobial, Real Drain. Furnished with Flexi-Guard ® Safety Bubbler. Electronic Bottle Filler Sensor With Electronic Front And Side Bubbler Pushbar activation. Product shall be Wall Mount (On Wall), for Indoor applications, serving 2 station(s). Unit shall be certified to UL 399 and CAN/CSA C22.2 No. 120. Unit shall be lead-free design which is certified to NSF/ANSI 61 & 372 (lead free) and meets Federal and State low-lead requirements.

Special Features:	Hands Free, Visual Filter Monitor, Filtered, Green Ticker™, Laminar Flow, Antimicrobial, Real Drain
Finish:	Stainless Steel
Power:	115V/60Hz
Bubbler Style:	Flexi-Guard ® Safety Bubbler
Activation by:	Electronic Bottle Filler Sensor With Electronic Front And Side Bubbler Pushbar
Mounting Type:	Wall Mount (On Wall)
Chilling Option:	Non-refrigerated
Full Load Amps	1.1
Rated Watts:	15
Dimensions (L x W x H):	36-3/4" x 19" x 39-1/16"
Approx. Shipping Weight:	82 lbs.
Installation Location:	Indoor
No. of Stations Served:	2

Special Note: *Coming soon: The Elkay ezH2O you know and love is getting a fresh look, as shown here. In stock models may have prior logo design.

- Visual Filter Monitor: LED Filter Status Indicator for when filter change is necessary.
- Filter is certified to NSF 42 and 53 for lead, particulate, chlorine, taste and odor reduction. 3,000 gal. capacity.
- Green Ticker: Informs user of number of 20 oz. plastic water bottles saved from waste.
- Laminar flow provides clean fill with minimal splash.
- Silver Ion Antimicrobial protection on key plastic components to inhibit the growth of mold and mildew.
- Real Drain System eliminates standing water.

AMERICAN PRIDE. A LIFETIME TRADITION.
Like your family, the Elkay family has values and traditions that endure. For almost a century, Elkay has been a family-owned and operated company, providing thousands of jobs that support our families and communities.

BUILT IN USA

Included with Product: Water Cooler (LZSTLDDWSSC), Bottle Filler (LZWSR), Filter

▼ **Ships in multiple boxes.**

PRODUCT COMPLIANCE

ADA & ICC A117.1
Buy American Act
CAN/CSA C22.2 No. 120
GreenSpec®
NSF/ANSI 42, 53, 61, & 372 (lead free)
UL 399

Intertek C USA

GreenSpec® LISTED www.GreenSpec.com

Complies with ADA & ICC A117.1 accessibility requirements when installed according to the requirements outlined in these standards. Installation may require additional components and/or construction features to be fully compliant. Consult the local Authority Having Jurisdiction if necessary.

Installation Instructions (PDF)

Electrical components and water system are warranted for 12 months from date of installation. **Warranty pertains to drinking water applications only. Non-drinking water applications are not covered under warranty.**

Warranty (PDF)

OPTIONAL ACCESSORIES

51300C - WaterSentry Plus Replacement Filter (Bottle Fillers)
LKAPREZL - Elkay Cane Apron for EZ Gray
MLP200 - Accessory - In Wall Carrier (Bi-Level) for bi-level EZ, LZ, EMABF, LMABF, VRC, LVRC models
98568C - WaterSentry Filter Mounting Cover (Stainless Steel)

PART:_____ QTY: _____
PROJECT:_____
CONTACT:_____
DATE:_____
NOTES:_____
APPROVAL:_____

In keeping with our policy of continuing product improvement, Elkay reserves the right to change product specifications without notice. Please visit elkay.com for the most current version of Elkay product specification sheets. This specification describes an Elkay product with design, quality, and functional benefits to the user. When making a comparison of other producers' offerings, be certain these features are not overlooked.

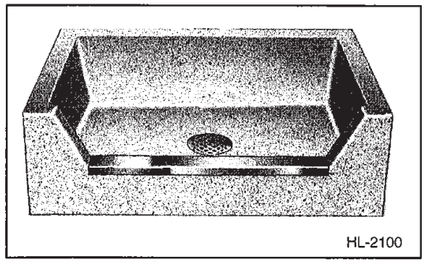
STERN

WILLIAMS

HILOW® CORLOW®

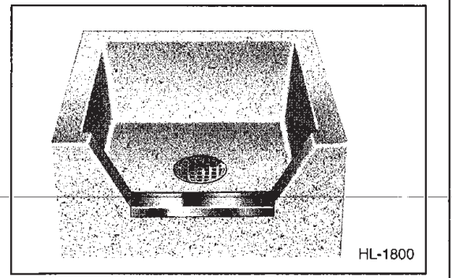
MOP SERVICE BASINS

ARCHITECTURAL SPECIFICATIONS



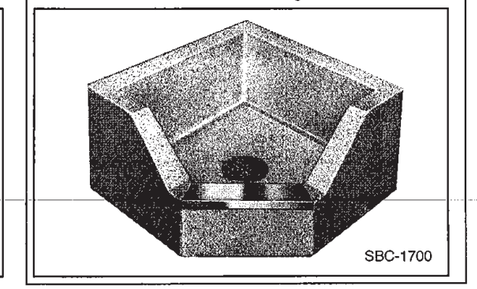
HL-2100

HILOW®



HL-1800

CORLOW®



SBC-1700

6" FRONT DROP WITH STAINLESS STEEL CAP

MODEL	SIZE
HL-1800	24"x24"x12"
HL-1900	32"x32"x12"
HL-2000	36"x36"x12"
HL-2100	36"x24"x12"

6" FRONT DROP WITH STAINLESS STEEL CAP ALL SIDES

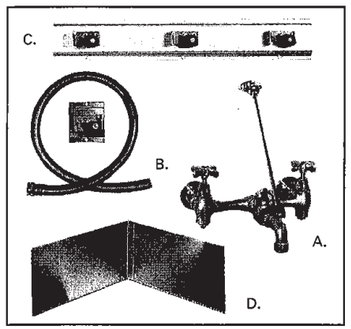
MODEL	SIZE
HL-1810	24"x24"x12"
HL-1910	32"x32"x12"
HL-2010	36"x36"x12"
HL-2110	36"x24"x12"

6" FRONT DROP WITH STAINLESS STEEL CAP

MODEL	SIZE
SBC-1700	24"x24"x12"
SBC-1702*	24"x24"x12"
SBC-1725	32"x32"x12"
SBC-1750	36"x36"x12"

*NOTE: 2 tiling flanges extending 1" above shoulder on 2 sides.

Model No. ( ) Size ( ), as manufactured by Stern-Williams Co., Inc. Shoulders shall not be less than 9-3/4" high inside measurement, and not less than 1-1/4" wide. All models have 6" drop at threshold. Drain shall be cast brass with stainless steel strainer cast integral and shall provide for a caulked lead connection not less than 1" deep to a 3" pipe. Receptor composed of pearl gray marble chips and white Portland cement ground smooth, grouted and sealed to resist stains. Stainless steel cap of one piece 20 ga. 302 stainless steel cast integral on threshold.



QUALITY OPTIONAL FITTINGS

A. **T-10-VB** Mop-Service sink fitting with vacuum breaker, adjustable top brace, 3/4" hose thread on spout with bucket hook inlets 8" on center, chrome finish.

T-15 VB same as above with polished chrome finish.

B. **T-35** Hose and wall hook. Hose 36" long, with 3/4" chrome couplings. Wall bracket of stainless steel.

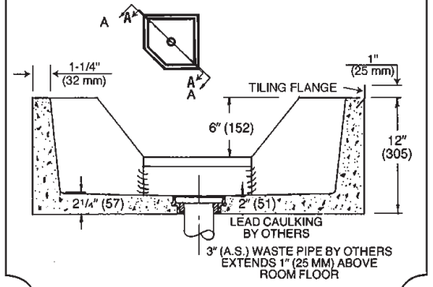
C. **T-40** Stainless Steel Mop Hanger of stainless steel with #4 finish. . . 24" long, with 3 rubber spring loaded grips.

D. **BP** Splash Catcher Panels of 20 ga. type 304 stainless steel.

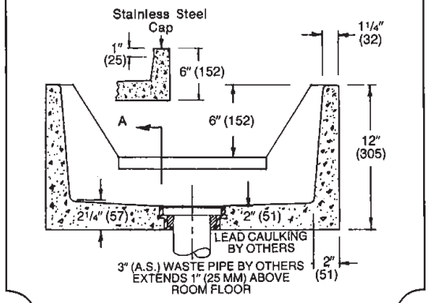
JOB **ARCHITECT**

LOCATION **ENGINEER**

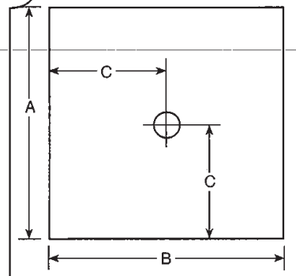
CROSS SECTION SERIES 1700



CROSS SECTION SERIES 1800, 1900, 2000, 2100



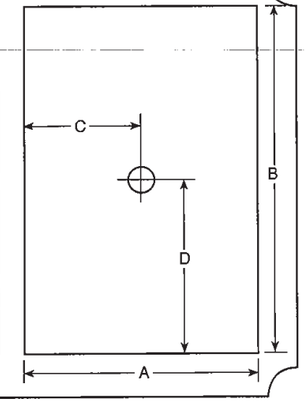
ROUGH-IN SERIES 1800, 1900, 2000, 2100



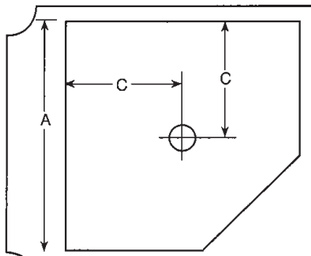
MODEL	A		B		C	
	IN	MM	IN	MM	IN	MM
1800	24	610	24	610	12	305
1900	32	813	32	813	16	406
2000	36	915	36	915	18	457

MODEL	A		B		C	
	IN	MM	IN	MM	IN	MM
1810	24	610	24	610	12	305
1910	32	813	32	813	16	406
2010	36	915	36	915	18	457

MODEL	A		B		C		D	
	IN	MM	IN	MM	IN	MM	IN	MM
2100	24	610	36	915	12	305	18	457
2110	24	610	36	915	12	305	18	457



ROUGH-IN MODEL 1700 SERIES



MODEL	A		B		C	
	IN	MM	IN	MM	IN	MM
SBC-1700	24	610	24	610	12	305
SBC-1702	24	610	24	610	12	305
SBC-1725	32	813	32	813	12	305
SBC-1750	36	915	36	915	12	305

Note: All dimensions subject to manufacturing variance of plus or minus 1/4" (6 MM).

STERN-WILLIAMS CO., INC. • P.O. Box 8004 • Shawnee Mission, Kansas 66208 USA
Telephone: (913) 362-5635 • Fax: (913) 362-6689 • Web address: www.sternwilliams.com

NO. HC 9-02

MECHANICAL FAUCETS

897-CP

MSK-1

Manual and Metering Faucets

CHICAGO FAUCETS
a Geberit company

Product Type

Wall Mounted 8" Body, Adjustable Arms 7 5/8" - 8 3/4" Hot and Cold Water Sink Faucet

Job Name _____

Item Number _____

Section/Tag _____

Model Specified _____

Architect _____

Engineer _____

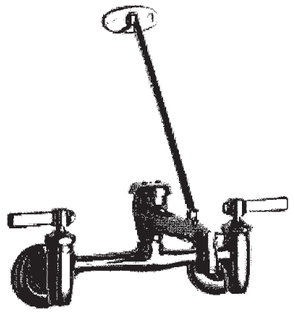
Contractor _____

[ ] Submitted as Shown [ ] Submitted with Variations

Date _____

Features & Specifications

- 8" Body, Adjustable Arms 7 5/8" - 8 3/4"
- 2-3/8" Lever Handle
- Quaturn Compression Operating Cartridge
- 1/2" NPT Adjustable Female Union Nut Supply Arms
- 3/4" Male Hose Thread Outlet
- Integral Stop Valves for Servicing the product
- Atmospheric Vacuum Breaker, Not Intended for Continuous Pressure Applications
- Vacuum Breaker Spout with Pail Hook and Wall Brace
- Atmospheric Vacuum Breaker, Not Intended for Continuous Pressure Applications
- CFNow! Item Ships in 5 Days



Performance Specification

- Rated Operating Pressure: 20-125 PSI
- Rated Operating Temperature: 40-140°F

Warranty

- Lifetime Limited Faucet Warranty
- 5-Year Limited Cartridge Warranty
- 1-Year Limited Finish Warranty

Codes & Standards

- ASME A112.18.1/CSA B125.1
- ADA ANSI/ICC A117.1

2100 South Clearwater Drive
Des Plaines, IL
P: 847/803-5000
F: 847/803-5454
Technical: 800/TEC-TRUE
www.chicagofaucets.com

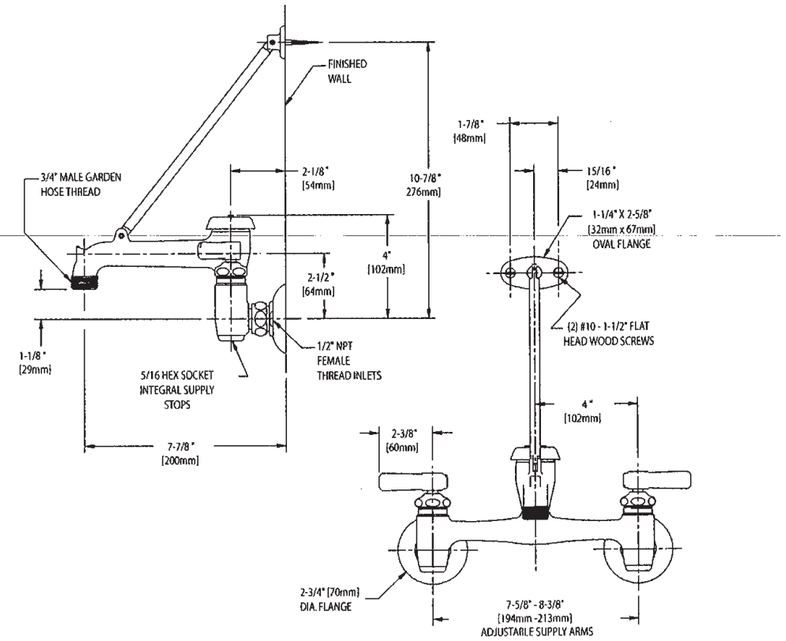
897-CP

Manual and Metering Faucets

CHICAGO FAUCETS
a Geberit company

Architect/Engineer Specification

Chicago Faucets No. 897-CP, Wall Mounted 8" Body, Adjustable Arms 7 5/8" - 8 3/4" Hot and Cold Water Sink Faucet, Chrome Plated solid brass construction. Vacuum Breaker Spout with Pail Hook and Wall Brace. 2-3/8" Metal Lever handle(s) with Eight Point Tapered Broach and Secured Blue and Red Buttons. Quaturn™ rebuildable compression cartridge, opens and closes 90°, closes with water pressure, features square tapered stem. 1/2" NPT Adjustable Female Union Nut Supply Arms. 3/4" Male Hose Thread Outlet. Integral Stop Valves for Servicing the product. Atmospheric Vacuum Breaker, Not Intended for Continuous Pressure Applications. Atmospheric Vacuum Breaker, Not Intended for Continuous Pressure Applications. Secondary Control Valve: Vacuum Breaker Spout with Pail Hook and Wall Brace. .



Operation and Maintenance

Installation should be in accordance with local plumbing codes. Flush all pipes thoroughly before installation. After installation, remove spout outlet or flow control and flush faucet thoroughly to clear any debris. Care should be taken when cleaning the product. Do not use abrasive cleaners, chemicals or solvents as they can result in surface damage. Use mild soap and warm water for cleaning and protecting the life of Chicago Faucet products. For specific operation and maintenance refer to the installation instructions and repair parts documents that are located at www.chicagofaucets.com.

Chicago Faucets, member of the Geberit Group, is the leading brand of commercial faucets and fittings in the United States, offering a complete range of products for schools, laboratories, hospitals, office buildings, food service, airports and sport facilities. Call 1.800.TECTRUE or 1.847.803.5000 Option 1 for installation or other technical assistance.

2100 South Clearwater Drive
Des Plaines, IL
P: 847/803-5000
F: 847/803-5454
Technical: 800/TEC-TRUE
www.chicagofaucets.com

Last Revision: 10/12/2011 • Date Printed: 09/4/2013 • Product specifications subject to change without notice

Z1900

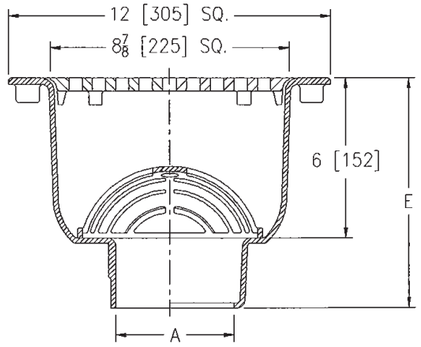
FD-1

12 x 12 [305 x 305] A.R.E. SANI-FLOR RECEPTOR 6 [152] SUMP DEPTH

SPECIFICATION SHEET

TAG _____

Dimensional Data (inches and [mm]) are Subject to Manufacturing Tolerances and Change Without Notice



A Pipe Size In.	Approx Wt. Lbs. [kg]	Grate Open Area Sq. In. [cm²]
2-3-4 [51-76-102]	32 [15]	31 [200]

ENGINEERING SPECIFICATION: ZURN Z1900
Sani-Flor Receptor 12 x 12 x 6 [305 x 305 x 152] deep cast iron body and square, light-duty grate with 1/2 [13] slotted openings, white acid resisting porcelain enamel interior and top, complete with white ABS anti-splash interior bottom dome strainer.

OPTIONS (Check/specify appropriate options)

PIPE SIZE
2-3-4 [51-76-102]
2-3-4 [51-76-102]
2-3-4 [51-76-102]

(Specify size/type) **OUTLET**
___ IC Inside Caulk
_✓_ NH No-Hub
___ NL Neo-Loc

'E' BODY HT. DIMENSION Z	ZN / ZS
8-5/8 [219]	9-1/8 [232]
8-5/8 [219]	9-1/8 [232]
8 [203]	8-1/2 [216]

PREFIXES
___ Z Cast Iron Body with White A.R.E. Interior*
___ ZN Cast Iron Body with White A.R.E. Interior, 12-1/2 [317] Square N.B. Frame and Full Grate with 1/2 [13] Openings (Add 1/2 [13] to 12 [305] Dim.)
_✓_ ZS Cast Iron Body with White A.R.E. Interior, 12-1/2 [317] Square Stainless Steel Frame and Full Grate with 1/2 [13] Openings (Add 1/2 [13] to 12 [305] Dim.)

SUFFIXES
___ -DX Dex-O-Tex Flange (ZN Only)
___ -HD Stainless Steel Frame w/ X-Heavy Duty Stainless Steel Grate (ZS Only)
___ -HP Heel-Proof Grate (ZN Only)
___ -K Anchor Flange
___ -KC Anchor Flange with Seepage Holes and Clamp Collar
___ -LD (Less) Bottom Dome Strainer
___ -P 1/2 [13] Trap Primer Connection (See Z1023)
___ -SA Stabilizer Assembly (See Z1903)
___ -TC Neo-Loc Test Cap Gasket (2-4 [51-102] NL Bottom Outlet Only)
___ -VPS Vandal-Proof Strainer
___ -1 (Less) Grate
___ -2 1/2 Grate
___ -3 3/4 Grate
___ -4 Full Grate w/ Center Opening (2 [51] Dia. for Z) and (3-1/32 [77] Square for ZN & ZS)
___ -5 Grate w/ 4 [102] Dia. x 3-3/4 [95] High Funnel
___ -6 Grate w/ 6 [152] Dia. x 6 [152] High Funnel
___ -7 Grate w/ 6-3/4 x 3 x 1 [171 x 76 x 25] High Oval Funnel
___ -8 Grate w/ 8-7/8 x 3-5/8 x 3-3/4 [225 x 92 x 95] High Oval Funnel
___ -9 Angle Frame and Grate (ZN Only)
___ -11 Vandal-Proof Secured Top (ZN & ZS Only)
___ -12 Depressed Aluminum Grate (ZN Only)
___ -15 Solid Loose Set Cover (Z & ZN Only)
___ -16 1/2 Solid Loose Set Cover (Z & ZN Only)
___ -17 3/4 Solid Loose Set Cover (Z & ZN Only)
___ -18 Solid Loose Set Cover w/ Center Opening (2-1/4 [57] Square for Z Only) and (3 [76] Square for ZN Only)
___ -19 Full Hinged Grate (ZN Only)
___ -23 Aluminum Bucket
___ -25 White A.R.C. Bucket
___ -31 Stainless Steel Mesh Liner for Bucket
___ -32 Aluminum Dome Strainer
___ -33 White A.R.C. Anti-Splash Bottom Dome Strainer
___ -34 N.B. Anti-Splash Bottom Dome Strainer

*REGULARLY FURNISHED UNLESS OTHERWISE SPECIFIED

REV. L DATE: 9/20/11 C.N. NO. 122166
DWG. NO. 59341 PRODUCT NO. Z1900

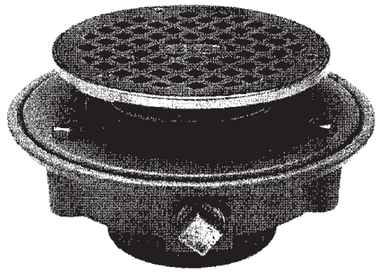
ZURN INDUSTRIES, LLC. ♦ SPECIFICATION DRAINAGE OPERATION ♦ 1801 Pittsburgh Ave. ♦ Erie, PA 16514
Phone: 814/455-0921 ♦ Fax: 814/454-7929 ♦ World Wide Web: www.zurn.com
In Canada: ZURN INDUSTRIES LIMITED ♦ 3544 Nashua Drive ♦ Mississauga, Ontario L4V1L2 ♦ Phone: 905/405-8272 Fax: 905/405-1292

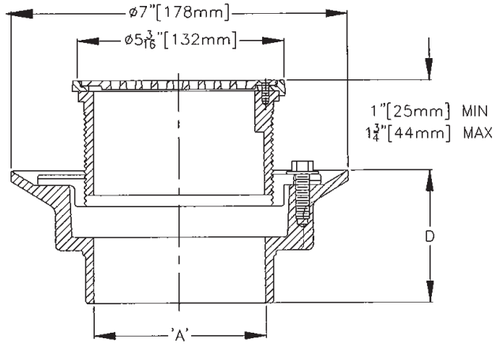
ZURN LIGHT COMMERCIAL LC®

FD-1

FD-2321 Low Profile Finished Area Floor Drain

TAG_____



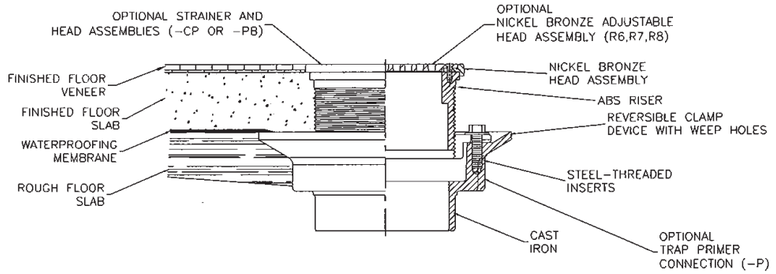


FD-2321 Low Profile Adjustable Finished Area Floor Drain with Square Top
Recommended for finished floor areas where a membrane is generally used. This drain is designed for foot traffic and light cart applications. Complete with cast iron body, clamping collar and adjustable nickel bronze strainer assembly. 1/2" [13mm] trap primer connection provided with plug.

OPTIONS:
_✓_ -CP Chrome Plated Strainer
___ -PB Polished Brass Strainer
___ -R6 6" Dia. Nickel Head Assembly
___ -R7 7" Dia. Nickel Head Assembly
___ -R8 8" Dia. Nickel Head Assembly
___ -VP Vandal Proof

	Product	Connection 'A'	D
✓	FD-2321-NH2	2"[51mm] No-Hub	2-1/2"[64]
___	FD-2321-NH3	3"[76mm] No Hub	2-1/2"[64]
___	FD-2321-NH4	4"[102mm] No-Hub	2-1/2"[64]
___	FD-2321-PO2	2"[51mm] Push-On	3-1/3"[85]
___	FD-2321-PO3	3"[76mm] Push-On	4-1/3"[110]
___	FD-2321-IP2	2"[51mm] IPS	2-1/2"[64]
___	FD-2321-IP3	3"[76mm] IPS	2"[51]

Typical Installation



ZURN LIGHT COMMERCIAL PRODUCTS 2855 GIRTS ROAD , JAMESTOWN, NY 14701 PHONE: 716-665-1131 FAX: 716-665-3126
World Wide Web: WWW.ZURN.COM

Rev. Date: 6/19/03 C.N. No. 90599
Dwg. No. 80039 Product No. FD-2321

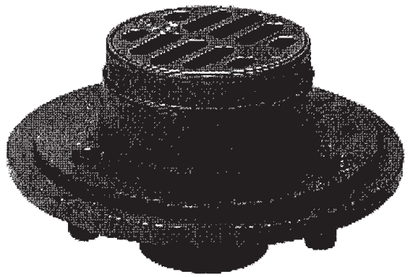
ZURN LIGHT COMMERCIAL LC®

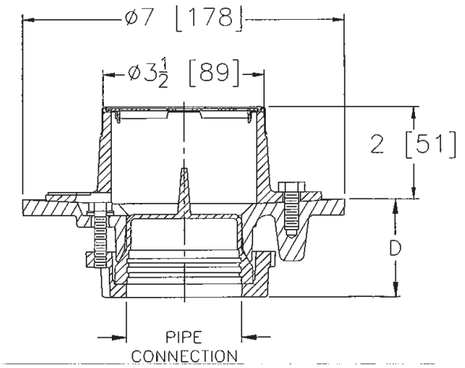
SHD-1

FD2251-CI Cast Iron Shower Drain

TAG _____

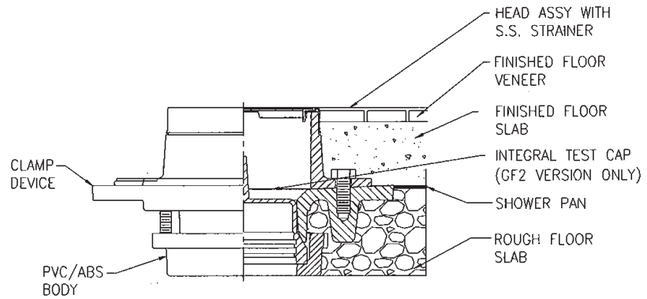
Dimensional Data (inches and [mm]) are Subject to Manufacturing Tolerances and Change Without Notice





Product	'A' Outlet Connection
__ FD2251-CI-NH2	2 [51] NO-HUB
__ FD2251-CI-QF2	2 [51] QUICK-FIT

FD2251-CI Cast Iron Shower Drain
Recommended for shower area installations where a water-proofing membrane is used. Each body is furnished with a slotted secured strainer and a 7 [178] diameter cast iron body and top assembly with weep holes.



Typical installation

ZURN INDUSTRIES, LLC. ♦ SPECIFICATION DRAINAGE OPERATION ♦ 1801 Pittsburgh Ave. ♦ Erie, PA 16514
Phone: 814/455-0921 ♦ Fax: 814/454-7929 ♦ World Wide Web: www.zurn.com
In Canada: ZURN INDUSTRIES LIMITED ♦ 3544 Nashua Drive ♦ Mississauga, Ontario L4V1L2 ♦ Phone: 905/405-8272 Fax: 905/405-1292

Rev. Date: 08/17/09 C.N. No. 110074
Dwg. No. 84306 Product No. FD2251-CI

Mechanical Standards

DESIGN STANDARD for Basic HVAC System Design

Purpose:

The purpose of this document is to standardize the basic elements of the HVAC system design process. This design standard has the purpose of creating a consistent application of HVAC system design throughout the Solano Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Codes – Systems will be designed in accordance with the latest edition of the following codes:

- California Building Code.
- California Mechanical Code.
- California Plumbing Code.
- California Fire Code.
- National Electrical Code; California Electrical Code.
- State of California Code of Regulations (CCR).
- Energy Efficiency Standards and Title 24 Regulations.
- Local City Amendments and Regulations.
- DSA – Department of the State Architect.

Standards – The following reference standards will be used for the design:

- AMCA – Air Movement and Control Association International, Inc.
- ANSI – American National Standards Institute.
- ARI – Air Conditioning and Refrigeration Institute.
- ASHRAE – American Society of Heating, Refrigeration, and Air Conditioning Engineers.
- SMACNA – Fire and Smoke Damper Installation Guide.
- SMACNA – Guidelines for Seismic Restraints of Mechanical Systems.
- SMACNA – Standards for Duct Construction.
- EPA – Environmental Protection Agency.
- NEMA – National Electrical Manufacturer's Association.
- UL – Underwriters' Laboratories.
- NFPA - National Fire Protection Association.
- NFPA 90A – Air Conditioning and Ventilating Systems.
- NFPA 101 – Life Safety Code.
- LEED – U.S. Green Building Council.

HVAC Calculation

- Utilize the following outside air temperatures in calculating HVAC system capacities:
  - Solano College (Fairfield, Vallejo, Vacaville - Climate Zone 3, CEC T-24 0.5%):
- Lighting Loads: Lighting loads shall be calculated at CEC T-24 Watt per square foot values during preliminary design. Engineers shall execute final calculations upon selection of final lighting fixture selections.
- Equipment Loads: Equipment loads are variable and should be based on actual equipment to be installed in each location. Engineer shall apply diversity factors so as not to oversize central HVAC systems.
- Thermal Mass: Thermal mass shall be considered during calculations as a method to offset cooling loads.
- U-Values for Walls and Roofs: Loads shall be calculated at CEC T-24 allowances during preliminary design. Engineers shall execute final calculations upon selection of final building façade materials.
- U-Values for Solar Heat gain Factors for Windows: Loads shall be calculated at CEC T-24 allowances during preliminary design. Engineers shall execute final calculations upon selection of final building façade materials.
- Cooling system pick-up capacity: 10% of total load
- Heating system pick-up capacity: 25% of total load

- All calculations shall be completed utilizing DOE approved calculation software.
- Pipe sizing calculations: 4.0'/100'HD for main piping; 3.5'/100' HD for branch piping; 7 fps maximum velocity in occupied spaces.
- Duct sizing calculations: equal friction method - 0.1"/100' for main ductwork (never exceed 2,000 feet per minute); 0.08"/100' for low pressure branch ductwork (never exceed 800 feet per minute). Lower velocities may be needed for acoustical purposes.
- Return air systems – Return air ducts shall be sized on the equal friction method at 0.08"/100' (never exceed 1,500 feet per minute). Design plenum return air systems for low pressure drops. Design transfer air systems at 250 feet per minute to minimize pressure drop.
- Interior temperature requirements:
  - General conditions
    - Summer time cooling design 73°F +/- 3°F, no RH control (no cooling control except through ventilation for buildings deemed not to have cooling systems)
    - Winter time heating design: 70°F +/- 3°F, no RH control
- Acoustical and Vibration Calculations:
  - Acoustical calculations shall be completed by a professional specializing in the science of sound transmission, acoustics, and vibration.
  - Design shall conform to ASHRAE Chapter "Sound and Vibration Control", latest edition and the Solano Community College District Acoustical Design Standards.

Outside Air Make-up and Ventilation

- Utilize CEC T-24 and/or ASHRAE Standard 62 (whichever is most stringent), latest edition, to determine outside air ventilation flow rates. Indicate quantities of minimum outside air on all equipment schedules.
- Outside air for ventilation and make-up shall be brought from a fresh source of air. Outside air openings and operable building systems shall be located at a minimum of 15-0" from any permanent or temporary points of:
  - Boiler exhaust
  - Kilns
  - exhaust air
  - plumbing vents
  - areas of objectionable odor
  - locate away from loading docks, parking lots, adjacent roadways, etc.
  - 30'-0" separation from non-environmental exhaust systems (as defined by the CMC) such as kitchen exhaust, lab fume hood exhaust, garage exhaust, etc. Increase separation where openings are downwind from sources listed above.
- Design outside air intakes to eliminate the possibility of water carry over. Always utilize drainable weatherproof type louvers at intakes.
- Provide CO2 monitoring to accommodate demand based ventilation to reduce energy use. Monitors shall be connected to the BMS. Consider for large occupancy areas such as:
  - Classrooms
  - Gymnasiums
  - Theatres
  - Lecture halls
  - Auditoriums
  - Lobbies
  - Cafeterias
  - Meeting rooms
  - Conference rooms
- Determine if natural ventilation can be utilized for comfort cooling either by itself or as part of a mixed-mode system. Prior to locating intakes, consider:
  - pollution sources
  - acoustical interferences
  - security
  - airflow patterns via CFD modeling

- Consider the use of ultraviolet lamps at AHU outside air coils to kill bacteria and mold that may grow in air handling units. Ultraviolet lamps will not only kill bacteria and mold but also have the advantage of reducing maintenance for coil cleaning.

Equipment Selection

- HVAC Systems: Specific system types are either addressed in the program or where a system is not indicated shall be addressed by the engineer of record for the project based on:
  - Lifecycle cost analysis to include first cost, operating cost, maintenance cost, energy cost
  - Reliability
  - Temperature control
  - Noise level
  - System complexity
  - Life expectancy – Minimum life expectancy for equipment shall be 25 years
  - Susceptibility to vandalism
- Equipment General:
  - Provide an integrated design so that each element of the building is carefully considered. Produce a holistic solution.
  - Utilize shading, landscape, canopies, blinds, building thermal mass, etc. to reduce heating and cooling loads and minimize equipments sizes.
- Fans:
  - Fans shall be selected on a stable point of operation of the fan curve. Fan selection shall be based on methods in the ASHRAE Handbook, most recent edition.
  - Select Motor sizes and speed should provide a 15% safety factor for deviation in fan static pressure and future airflow increases.
  - Static pressure of fans shall be determined from pressure drop calculations (based on the most hydraulically remote location) including:
    - ductwork
    - fittings
    - diffusers/grilles
    - ductwork accessories
    - system effects
    - specialties and appurtenances
    - discharge velocity pressure
  - Select fan noise sound and pressure levels to assure quite operation per acoustical requirements above.
  - Kitchen Grease Exhaust: Fans shall be UL listed for such service. Provide with drain. Consider location of kitchen smoke exhaust with regards to campus views, deterioration of building façade, and odors.
  - Fume Hood Exhaust Fans: Fans shall be UL listed for such service. Provide explosion proof systems with appropriate coatings to prevent chemical action on fan housing.
- Cooling Coils
  - Design direct expansion and chilled water coils on basis of a nominal 400-500 foot per minute face velocity.
  - All cooling coils shall be pipe counterflow of refrigerant against airflow.
  - Select the Cv of each coil control valve at design conditions.
  - Design with upward flow through coil and air vents at all high points of coils to eliminate trapped air.
  - At a minimum design with isolation valves on supply and return, two or three way control valve based on pumping system design, drain, flexible connections, and temperature gage.
- Heating Coils
  - Design heating water coils on basis of a nominal 600 foot per minute face velocity.
  - All heating coils shall be pipe counterflow of refrigerant against airflow.
  - Select the Cv of each coil control valve at design conditions.
  - Design with upward flow through coil and air vents at all high points of coils to eliminate trapped air.

  - At a minimum design with isolation valves on supply and return, two or three way control valve based on pumping system design, drain, flexible connections, and temperature gage.

- Air Distribution Devices
  - Supply Diffusers:
    - Preferred method of air distribution due to aspiration and entrainment of room air (reduction of drafts and more even room temperature profiles) as well as the ability to distribute air in many different directions.
    - Supply air grilles shall be sized based on manufacture's airflow, noise criteria, mounting height, and pressure drop data.
  - Supply Grilles:
    - Avoid wall grilles where possible. Wall grilles have a lack of aspirating qualities and when discharging in cooling can create a perceived feeling of drafts. Where designed, use care. Utilizes a larger width to height aspect ratio for maximum induction of room air. Utilize double deflection type grilles to maximize adjustability. Do not throw air longer than 15-20 feet in rooms with low ceilings (below 9 feet).
    - Supply air grilles shall be sized based on manufacture's airflow, noise criteria, mounting height, and pressure drop data. Do not exceed 500 feet per minute.
  - Return Air Grilles
    - Locate to aid in contaminant displacement.
    - Design for low pressure loss in return plenum systems to assure that rooms do not get over-pressurized.
    - Return air grilles shall be sized based on manufacture's airflow, noise criteria, mounting height, and pressure drop data. Do not exceed 400 feet per minute for ducted systems and 250 feet per minute for plenum return systems.
- Sound Attenuation and Vibration Control
  - Where required utilize sound traps or acoustical duct lining to mitigate noise attributable to HVAC equipment.
  - Size of sound traps and length to be provided by an acoustical engineer after completion of calculations.
  - Length of acoustical lining to be provided by an acoustical engineer after completion of calculations.
  - Provide vibration isolation devices as required to meet ASHRAE recommendations for vibration transmission.
- Pumps
  - Select systems with two pumps. Deliver 100% capacity with both pumps operating in parallel. When one pump shuts down, a single pump shall be capable of providing 75-80% of the total capacity. Due to cost considerations standby pumps are not required unless there is a specific concern for redundancy.
  - For economical design and energy efficiency, end suction, base mounted pumps and in-line pumps should be used for most systems except when the systems become very large.
  - Dynamic head of pumps shall be determined from pressure drop calculations (based on the most hydraulically remote location) including:
    - piping
    - fittings
    - valves
    - coils
    - system effects
    - specialties and appurtenances
  - Pumps shall be capable of being removed for maintenance without having to drain the entire system.
- Temperature Control and Zoning
  - All buildings shall be connected to the campus wide DDC control network (Delta controls system). See DDC Controls Design Standards and Standard Specifications for additional criteria.
  - Individual temperature controls will be based on function, exposure, and Owner request.
  - Each corner exposure (NE, NW, SE, and SW) shall be on a separate temperature control zone.

- Each conference room, lobby, classroom, lecture hall, break area shall be on a separate temperature control zone.
- Perimeter closed offices will be provided with no more than three to five offices per group of offices along the same orientation. This requirement may be relaxed when utilizing variable volume diffusers and terminal units are used primarily as a means of pressure control and reheat, however, group variable volume diffusers along the same orientation.
- Large group spaces shall allow user-adjustable controls restricted to +/- 2°F with a time-out after 2 hours.

- Specialty Considerations
  - Central Plants
    - The purpose of a central plant is to reduce overall energy costs, limit noise and vibration to occupied spaces, reduce maintenance to a single location for boilers, chiller, and pumps, increase the aesthetic nature for the remainder of the campus.
    - All campuses that have existing central plants for heating and/or cooling shall have new and/or modernized buildings connected to the central plant. Exceptions will be made based on project budget and other factors.
    - Equipment selection for new central plants should be industrial commercial grade.
    - Systems should be easy to maintain and operate.
    - Consideration should be given for expansion.
    - Sequences shall be determined to minimize energy use and take advantage of low part-load conditions that occur frequently at the campuses.
  - Specialty Pressure Requirements and Exhaust Systems
    - Specific rooms shall be designed to be at a negative pressure to adjoining spaces and to be exhausted 100%. These rooms include but are not limited to: restrooms, certain labs (confirm with activity and use), certain science classrooms (confirm with activity and use), kitchens, janitor closets, copy rooms, food service rooms, loading docks, locker rooms, shower facilities, photograph rooms and dark rooms, art classrooms (confirm with activity and use), refrigeration machinery rooms, boiler rooms, etc.
    - Areas with products of combustion need removal of the products and a source of combustion air.
  - Food Service Facilities
    - The kitchen shall be designed with separate exhaust systems for each hood allowing each hood to be separately controlled. Fans shall be at the end of the exhaust system and located in the exhaust duct. Exhaust airflow shall be at a rate of 1500 feet per minute minimum to create a capture velocity. No duct accessories are allowed in the kitchen exhaust system.
    - Provide separate exhaust systems for dishwashing. Ductwork shall be non-corrosive stainless steel and pitched for drainage. A duct drain shall be provided at the low point of the ductwork. Do not trap water in the duct.
    - Exhaust ductwork shall be specifically designed of materials compatible for kitchen grease exhaust
    - Make up air can either be provided from make-up air handlers or by transfer of air from adjoining spaces, Code permitting.
    - The make-up air and exhaust air systems shall be interlocked.

Sustainable Design Practices

- The Solano Community College District has a desire to build buildings utilizing sustainable design techniques. As part of the Mechanical Design Standards, sample sustainable design opportunities are provided in a table in the sustainability section of the Solano Community College District standards. Each strategy needs to be integrated appropriately into their respective projects. Development of design strategies for each item is beyond the scope of this Design Standard and requires careful consideration for proper application. The District will select on a case by case basis, which projects will be LEED™ Certified and to what level.

Approved Manufacturers:

Not Applicable

Substitutes Allowed:

Not Applicable

Associated Design Standards and Specifications

- All Division 23 Design Standards and Construction Specifications

DESIGN STANDARD for HVAC Piping

Purpose:

The heating, ventilating, and air-conditioning piping materials are an essential element of the mechanical systems. This design standard has the purpose of creating a consistent application of heating, ventilating, and air-conditioning piping material requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, reliability, and energy efficiency throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation and testing of pipe, tubing and fittings for complete and operable systems.

General Electrical Equipment Clearances: Do not route piping through electrical rooms, transformer vaults, elevator equipment rooms, and other electrical or electronic equipment spaces and enclosures. Within mechanical or plumbing equipment rooms, provide minimum 3 feet lateral clearance from sides of electric switchgear panels, MCC's, etc. Do not route piping above any electric power or lighting panel, switchgear, or similar electric device. Coordinate with electrical and coordinate exact pipe routing to provide proper clearance with such items.

Welding Qualification: Qualify welding procedures, welders and operators in accordance with ANSI B31.9 for shop and project site welding of piping work.

All piping shall meet the piping material requirements set forth:

- Steel pipe:
  - ASTM A53, Hot Dipped, Zinc Coated Welded or Seamless, Grade B: Black
- Copper tube:
  - Temper: Annealed (hard drawn)
- Pre-insulated underground piping systems:
  - Factory pre-insulated piping system, consisting of an inner media carrier pipe, insulation around the carrier pipe, and a water/vapor seal jacket over the insulation
  - Carrier Pipe Material: Schedule 40 black steel pipe with 150 PSI malleable screwed fittings

- Insulation: Rigid closed cell polyurethane, average density of at least 2 lb./ft.3, conforming to ASTM C552, Type II, Class 1, K factor of not more than 0.14 (BTU/in)/(hr/sq.ft./deg. F) at 50F
- Outer Casing: PVC pipe of minimum 60 mils thickness. Each factory prefabricated section provides complete sealing of the insulation at each end of the conduit section. Provide permanent water and vapor seal. Carry over the outer casing and extend it to the carrier pipe. Use prefabricated caps specifically designed for end seal of prefabricated insulation systems. Fabricate caps of the same material as the outer casing
- Includes: Expansion loops, Ells, Welded fitting and elbows, Moisture barrier and end seals, Anchors, Thrust Blocks.
- After anchor blocks are poured and cured, a hydrostatic test of 150 PSIG or 1-1/2 times operating pressure, whichever is greater, required for a period of 4 hours

- Fittings for steel pipe:
  - Flanges, fittings, unions and other products, mark in accordance with MSS SP-25
  - Welding Fittings: Wrought carbon steel fittings, ASTM A234, ANSI B16.9, B16.28. Butt-welding type unless otherwise indicated to be socket welding type
  - Branch Connections: From mains or headers 2-1/2 inches or larger, welded tees or forged welding outlets
  - Welding Outlets: "Weldolets" or "Threadolets" equivalent to Bonney Forge. Use forged welding outlets wherever branch line is at least 1 nominal pipe size smaller than local main or header
  - Threaded Fittings: ANSI B2.1, ASTM A47, 150 PSI rating, except where otherwise specified, prevailing codes or requirements or Specifications dictate use of 300 PSI rating. Fabricate from standard malleable iron with dimensions conforming to ANSI B16.3
  - Flanges: Carbon steel conforming to ASTM A105, ANSI B16.5, and factory forged in the USA. Flanges which have been machined, remade, painted, or are of non-domestic origin are not acceptable. Provide raised or full face ends wherever indicated or required
  - Unions: ANSI B16.39, ASTM A47, and be fabricated from malleable iron with bronze-to-iron ground joints rated at 150 percent design operating pressure. Threads: ANSI B2.1
  - Fasteners: Semi-finished carbon steel bolts and hex nuts conforming to ASTM A307. Threads and Dimensions: ANSI B1.1 and B18.2
  - Threaded Pipe Plugs: ANSI B16.14
  - Provide thread lubricant

- Designers can use mechanical couplings for pipe systems identified in Design Standard 23 21 05 if there is a cost benefit in doing so. The increased cost of mechanical couplings shall be weighed against the ease of installation and reduced installation time. The Design Standard recommends that designers allow the contractor to decide if they will or will not use mechanical couplings on systems allowing such. Mechanical couplings for steel pipe:
  - Coupling Housings: Malleable iron ASTM A47 or ductile iron ASTM A536
  - Coupling Housing Description: Grooved or rolled mechanical type, which engages grooved or rolled shouldered pipe ends, encasing an elastomeric gasket which bridges pipe ends to create seal. Cast in two or more parts, secured together during assembly with nuts and bolts. Permit degree of contraction and expansion as specified in manufacturer's published literature
  - Gaskets: Mechanical grooved or rolled coupling design, pressure responsive so that internal pressure serves to increase seal's tightness, constructed of elastomers having properties as designated by ASTM D2000. Water Services: EDPM Grade E, with green color code identification
  - Bolts and Nuts: Heat treated carbon steel, ASTM A183, minimum tensile 110,000 PSI
  - Branch Stub-Ins: Upper housing with full locating collar for rigid positioning engaging machine-cut hole in pipe, encasing elastomeric gasket conforming to pipe outside diameter around hole, and lower housing with positioning lugs, secured together during assembly with nuts and bolts
  - Fittings: Grooved or rolled shouldered end design to accept grooved or rolled mechanical couplings: Malleable Iron: ASTM A47, Ductile Iron: ASTM A536; Fabricated Steel: ASTM A53, Type F for 3/4 to 1-1/2 inches, Type E or S, Grade B for 2 to 20 inches; Steel: ASTM A234
  - Flanges: Class 125 cast iron and Class 150 steel bolt hole alignment: Malleable Iron: ASTM A47, Ductile Iron: ASTM A536
  - Pipe/Grooved: Carbon steel, A-53B/A-106B/A135 Schedule 40. Roll or cut grooved-ends as appropriate to pipe material, wall thickness, pressures, size and method of

joining. Pipe ends to be grooved or rolled in accordance with current listed standards conforming to ANSI/AWWA C-606

- Fittings for copper tubing: Wrought copper/bronze solder joint fittings complying with ANSI B16.22.
- Insulating (Dielectric) Unions: Standard units recommended by manufacturer for use in the service indicated, which isolate ferrous from nonferrous piping, and prevent galvanic corrosion action. Minimum rated "flashover" voltage: 600 volts. Watts 3000 Series. Provide insulated flanges for flanged piping system connection to dissimilar metals.
- Welding Materials: Comply with Section 2-C of ASME Boiler Code, as applicable.
- Tin-Antimony Soldering Materials: ASTM B13.
- Gaskets for Flanged Joints: ANSI B16.12; full faced for cast iron flanges; raised face for steel flanges, unless otherwise indicated or recommended by manufacturer. Gaskets: Minimum 1/8-inch thick fabricated from non-asbestos bases.
- Copper-Brazed: Make brazed joints for copper tubing and fittings with code approved brazing filler alloys meeting ASTM and AWS standards and listings. Filler alloys of BCuP2 classification (e.g., "Phos-O" or "Fos-Copper") may not be used to make joints between copper tubing and cast brass or bronze fittings. Installations conform to accepted published procedures, i.e., CPC Installation Standard 3-75 and CDA Publications. Use of steel wool for cleaning tube and fittings is prohibited.
- Unions: Provide unions at all threaded connections to equipment, regulators, and controls that may have to be removed or replaced and at all points where necessary for the disassembly of piping for maintenance. Detail piping and unions to allow removal of equipment without springing pipe.
  - Steel Pipe Union: 150 PSI malleable iron, brass to iron seat, ground joint, black or galvanized to match pipe
  - Copper Pipe Union: 200 PSI working pressure. Bronze body, solder or grooved ends. Pipes 2 inches and under use ground joint, pipes 2-1/2 inches and larger use flanged face or grooved ends
  - Insulating Unions: 250 PSI working pressure. Pipe ends and material to match piping. Electric current below 1 percent of galvanic current. Gasket material as recommended by manufacturer. Epco or approved
- Escutcheons:
  - Brass material, chrome plated finish. Size sufficient to cover pipe openings through wall, floor or ceiling. Set screw or spring to secure to pipe. Coordinate opening sizes
- Sleeves: Provide sleeves on pipes passing through concrete or masonry construction. Extend sleeve 1 inch above finished floor. Caulk pipes passing through floor with non-shrinking grout or approved caulking compound. Provide "Link-Seal" sleeve sealing system for slab on grade or exterior wall penetrations. Caulk/seal piping and ductwork passing through fire rated building assembly with UL rated assemblies. Provide fire-rated assemblies per local AHJ requirements.
- Corrosion Control: Underground Steel Piping Corrosion Protection: Factory wrap un-insulated underground steel piping systems with protective coating composed of a coal-tar saturated wrapping tape over a 20 mil thick coal-tar epoxy coating, equivalent to "Republic X-Tru-Coat." Wrap joints spirally with a minimum overlap of 1/2 tape width. Extend wrap not less than 3 inches above grade. . Provide cathodic protection to meet requirements of NACE Standard RP0169-2002.
- Pipe Tests:
  - Make test before pipes are concealed
  - Fill system and remove air from system at least 24 hours before test begins
  - Correct leaks in screwed fittings by remaking the joint. Cut out leaks in welded joints and reweld; caulking is not permitted
  - Apply test pressure of 125 PSI and maintain for 1 hour with no visible leaks and no appreciable drop after the test pump has been disconnected

Approved Manufacturers:

Pre-insulated underground piping systems

- Rovanco
- Thermacore
- PERMA-PIPE

Mechanical Couplings

- Victaulic
- Gruvlok

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
- 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
- 23 21 05 - HYDRONIC PIPING SYSTEMS

DESIGN STANDARD for Common Motor Requirements for HVAC Equipment

Purpose:

The motor requirements for heating, ventilating, and air-conditioning equipment are an essential element of the mechanical systems. This design standard has the purpose of creating a consistent application of heating, ventilating, and air-conditioning equipment motor requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, reliability, and energy efficiency throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation and testing for complete and operable motors and starters for heating, ventilating, and air-conditioning equipment. These Design Standards are inclusive of motors that are field installed as well as integral to mechanical equipment.

All motors to meet the following requirements based on Code requirements and industry standard of care:

- Energy efficient, suitable for non-overloading operation, and capable of continuous operation at full nameplate rating. Motors 1 HP and larger must meet Energy Policy act of 1992. Motors to meet or exceed California Energy Commission Title 24 requirements.
- Take NEMA standards as minimum requirements for motor design and performance. Motors suitable for load, duty, voltage, frequency, hazard, and for service and location intended.
- For consistency and economy, motors, unless specified otherwise, to be general purpose open drip-proof type, ball bearing equipped, 40°C temperature rise, and rated for continuous duty under full load.
- To avoid unnecessary maintenance costs and early failure of equipment, all motors located outdoors to be TEFC motors (totally enclosed, fan cooled).
- Due to the harsh weather environment at Solano College, all motors exposed to the outside air stream (whether inside or outside of equipment) to be TEFC motors (totally enclosed, fan cooled).
- Motors smaller than 1/2 horsepower, 1 phase; and motors 1/2 horsepower and larger, 3 phase and voltage as indicated on Drawings. Maximum motor speed of 1750 RPM, unless otherwise noted. One phase motors to have internal thermal overload protection with automatic reset.

- Motors for belt drive to have adjustable bases with set screw to maintain belt tension.
- Provide inverter rated motors per NEMA MG1-31 where variable frequency drives are applied or where soft start starters are utilized.
- For consistency, all starters to be specified by Division 26.
- For consistency, all disconnects to be specified by Division 26.
- Motors to have name plate giving manufacturer's name, shop number, HP, RPM and current characteristics.

Approved Manufacturers:

- General Electric
- Westinghouse
- Baldor
- Reliance

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 23 05 48 - VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT
- 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
- 23 09 13 - VARIABLE FREQUENCY DRIVES

DESIGN STANDARD for General Duty Valves for HVAC

Purpose:

The heating, ventilating, and air-conditioning valves are an essential element of the mechanical systems. This design standard has the purpose of creating a consistent application of heating, ventilating, and air-conditioning valve requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, reliability, and energy efficiency throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation and testing of valves for a complete and operable systems.

All valves of a particular type and size range on any one project shall be the product of one manufacturer.

Valves shall be designed to be installed with the valve bonnet in an upright position to prevent deterioration or corrosion of the bonnet and packing.

Valve body materials shall be compatible with piping system materials.

A valve drain shall be provided at the base of each water piping riser and manual air vents shall be provided at the top of each riser and at the high point of the system.

All valves shall be provided with reusable strap-on insulation covers.

All exposed valves in finished areas shall be chrome-plated.

Insulation: Where insulation is indicated, install extended stem valves, arranged in proper manner to receive insulation

Design access panels, where a removal type ceiling is not planned, into the project so all valves are accessible

Locate isolation valves so that it is possible to isolate separate floors, separate wings, machinery rooms and other natural subdivisions of the building. Design isolation valves on each side of equipment to permit servicing or removal without draining system. Design valves at all services left for future connections (tees, stubs, etc.,) unless they are in a valved zone, or can be isolated by existing valves with minor loss of pipe contents when opened

All general duty HVAC valves shall meet the requirements set forth:

- Ball Valves
  - System supply and return piping shut-off and isolation valves for application in piping system up to and including 2-1/2" in diameter
  - Class 125, bronze body, screw-in bonnet, integral seat, renewable disc, straight body
- Butterfly Valves
  - System supply and return piping shut-off and isolation valves for application in piping system over 2-1/2" in diameter
  - 6 Inches and Smaller: 200 PSI, ductile iron body, extended neck, aluminum bronze disc, reinforced resilient EDPM seat, manual lever and lock
  - 8 Inches and Larger: 200 PSI, ductile iron body, extended neck, aluminum bronze disc, reinforced resilient EDPM seat, gear operator
- Globe Valves
  - Design for modulating services
  - 2 Inches and Smaller: Class 125, bronze body, screw-in bonnet, integral seat, renewable disc, straight body
  - 2-1/2 Inches and Larger: Class 125, iron body, bolted bonnet, flanged ends, renewable seat and disc, bronze mounted
- Balancing Valves
  - Provide balancing valves as required for proper balance and to maintain balance at part and full load conditions
  - Bronze with a machined orifice flow restriction, multi-turn globe type valve, internal O-rings, rated working pressure of at least 240 PSIG (175 PSI iron construction, 2-1/2 inches and larger), flow setting indicating pointer and calibrated nameplate, memory stops, and pressure readout port with integral check valve on each side of the orifice
- Check Valves
  - Where check valves are required, they shall be installed on the equipment side of all shutoff valves to facilitate servicing of the check valve
  - 2 Inches and Smaller: Class 125, bronze body, horizontal swing, regrinding type, Y-pattern, renewable disc
  - 2-1/2 Inches and Larger: Class 125, iron body, bolted bonnet, horizontal swing, renewable seat and disc, flanged ends
- Drain Valves
  - Class 125, bronze body, screw-in bonnet, rising stem, composition disc, 3/4-inch hose outlet
- Control Valves
  - The design documents shall include a valve schedule for all ATC valves. The schedule shall indicate service, flow, CV, and pressure drop
  - Control valves shall be closely coordinated with Division 25 requirements
  - 2-Inch or Less Two-Way Valves: Pressure independent, ball valve with forged brass nickel plated bodies and female NPT threads. Valves shall have blowout-proof stem design. Rate chrome plated ball and stem at a minimum of 400 psi water service with equal percentage characteristics from characterizing disc. Provide valves with reinforced Teflon seats. Minimum 200 psi close-off rating. Stainless steel, flow-limiting spring. 0-50 psi differential pressure operating range.
  - 2-Inch or Less Three-way Valves: Ball valve with forged brass nickel plated body and female NPT threads. Blow-out proof stem design. Rate stainless steel ball and stem at a minimum of 400 PSI water service with equal percentage characteristics from characterizing disc. Provide reinforced teflon seats.
  - 2-1/2 Inch to 6-Inch Modulating Control Valves: Iron body, globe valve, with flanged ends, bronze seat, and 316 stainless steel stem. TFE V-ring packing. Maximum 25 PSI differential pressure.
  - Two-Way and Three-Way Butterfly Control Valve: Valve body shall be of the full lug wafer style. Flanges shall meet ANSI 125 and 150 standards. Valves shall feature a single, through-shaft design for high-strength and positive disc control. The seat shall be made of heavy-duty, molded-in O-rings creating a positive seal between flange face and valve body. The seat shall provide positive bubble-tight close off.

Approved Manufacturers:

- Ball, Butterfly, Globe Valves, Check Valves, Drain Valves
  - Nibco
  - Crane
  - Milwaukee
- Balancing Valves
  - Bell & Gossett
  - Armstrong
  - Nibco
  - Wheatley
  - Tour & Anderson
- Control Valves
  - Belimo
  - Griswold

Substitutes Allowed:

No substitutions allowed on control valves and balancing valves.

Associated Design Standards and Specifications

- 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
- 25 55 00 – BUILDING MANAGEMENT SYSTEM

DESIGN STANDARD for Hangers and Supports HVAC and Piping and Equipment

Purpose:

The heating, ventilating, and air-conditioning piping and equipment hangers are an essential element of the mechanical systems. This design standard has the purpose of creating a consistent application of heating, ventilating, and air-conditioning piping and equipment hanger requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Material and installation of supports, anchors and sleeves including: horizontal piping hangers and supports; vertical piping clamps; hanger rod attachments; building attachments; saddles and shields; miscellaneous metals, miscellaneous materials; roof equipment supports; anchors; equipment supports; wall and floor sleeves; and escutcheon plates for a complete and operable systems.

- Design pipe hangers and supports whose materials, design and manufacture comply with MSS SP-58, "Pipe Hangers and Supports - Materials, Design and Manufacture," latest edition.
- Select and apply pipe hangers and supports complying with MSS SP-69, "Pipe Hangers and Supports - Selection and Application," latest edition. Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper-plated hangers and supports for un-insulated copper piping systems.
  - Pipe Hangers Size 2 Inches and Smaller: Adjustable swivel ring hanger, UL listed
  - Pipe Hangers Size 2-1/2 Inches and Larger: Adjustable clevis type, UL listed
- The use of pipe hooks, chains, plumbers tape, or perforated iron for pipe supports is not acceptable
- All piping shall be designed to maintain the required pitch and shall provide for proper expansion and contraction
- Vertical runs of pipe shall be supported with steel, UL listed riser clamps made specifically for pipe or for tubing

- Due to the harsh outdoor environment at Solano College, all piping supports at Solano College that are in contact with the outdoor air shall be protected against corrosion.
- Piping supports shall be designed to withstand seismic forces.
- Roof equipment supports: Coordinate the location and type of each roof equipment support with the roofing system supplier. Coordinate systems to maintain roof warranty. Due to Solano College's harsh outdoor environment all exposed equipment supports or equipment supports in mechanical rooms with contact to the outdoor air shall be protected against corrosion.
  - Compensate for slope in roof so top of support is level
  - Construct curb to withstand seismic forces
- Roof Pipe Supports: Support piping on roof with polyethylene high-density U.V. resistant quick "pipe" block with foam pad. Recommended installation is for quick "pipe" blocks to be freestanding. Piping 3 inch and larger mounted on roller hangers. Wood block supports are not acceptable due to increased maintenance and low reliability.
- Escutcheon Plates: Design around horizontal and vertical piping at visible penetrations through walls, partitions, floors, or ceilings, including penetrations through closets, through below ceiling corridor walls, and through equipment room walls and floors.

Approved Manufacturers:

- Pipe Hanger Supports
  - B-Line
  - Michigan
  - Superstrut
  - Unistrut
- Roof Equipment Supports
  - Pate ES
  - Custom Curb
  - Vibrex
  - Thycurb
- Roof Pipe Supports
  - Erico Pipe Piers
  - Nelson-Olsen Inc.

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 23 21 05 - HYDRONIC PIPING SYSTEMS

DESIGN STANDARD for Vibration and Seismic Controls for HVAC Piping, Ductwork, and Equipment

Purpose:

The vibration and seismic controls for heating, ventilating, and air-conditioning piping and equipment is an essential element of the mechanical systems. This design standard has the purpose of creating a consistent application of vibration and seismic control requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials and installation of seismic restraint devices, vibration isolation systems, and related items for complete and operable systems.

- Vibration Control
  - Mechanical and electrical equipment and associated piping and duct work shall be mounted by vibration isolators as required to minimize transmission of vibrations and noise to building structures or spaces.
  - Selection of isolator type shall be as given in Table 42, Selection Guide for Vibration Isolation, Chapter 47, “Sound and Vibration Control,” of the latest edition of the ASHRAE Applications Handbook.
  - All rotating equipment shall be balanced both statically and dynamically. Vibration shall not exceed the guidelines given in Table 42, Selection Guide for Vibration Isolation, Chapter 47, “Sound and Vibration Control,” of the latest edition of the ASHRAE Applications Handbook.
  - To minimize alignment problems, all motors over 5 hp must be designed to be solidly attached to a common base with the driven unit.
  - In order to minimize vibration, solid sheaves and band belts shall be designed to be used in multiple V-belt driven equipment over 15 hp.
- Isolation Equipment
  - Isolation shall be designed to be stable during starting and stopping of equipment without any transverse and eccentric movement of equipment that would damage or adversely affect operation of the equipment or appurtenances.
  - Isolation shall be designed for the operating speed of the equipment.
  - Isolators, including springs, exposed to the weather shall be hot dipped galvanized after fabrication. Hot dipped zinc coating shall comply with ASTM Method A-123 and shall not be less than 2 oz per square foot.
  - Isolators shall be selected and located to produce uniform loading and deflection even when equipment weight is not evenly distributed.
  - Isolation equipment includes: neoprene pads, hanger spring and neoprene, travel limited floor spring and neoprene, inertia base, flexible duct connections, flexible pipe connections, thrust limits, grommets, and snubbers.
- Seismic Control and Restraint
  - Brace or anchor mechanical equipment to resist horizontal forces acting in any direction using the CBC latest edition.
  - Provide factory fabricated seismic restrained vibration isolating components. Earthquake resistant designs for equipment, i.e., air handling units, blowers, motors, ductwork, and mechanical piping, to conform to the regulations of the CBC, latest edition. It is the Districts desire to use standard factory fabricated components, if they are not available, provide properly designed custom components which meet the requirements herein.
  - Design shall include earthquake bumpers to prevent excessive motion during starting and stopping of equipment and for earthquake bracing. Install bumpers after equipment is in operation to allow proper placement and alignment and ensure that bumpers are not engaged during normal system operation
  - Design the seismic bracing and anchorage of piping per Section 23 05 29
  - Design piping and ductwork seismic restraints using the document "Seismic Restraints Manual Guidelines for Mechanical Systems." Secure piping, ductwork, and the like to withstand a force in any direction.

  - Design restraints to meet CBC Seismic Restraint requirements. Provide structural engineering calculations sealed by a professional engineer registered in state of California.

- Seismic Pipe Loops and Pipe Expansion
  - The design shall examine the piping system and shall design expansion compensation into the system by use of expansion loops, flexible connectors or, where space is limited, self-aligning bellows-type expansion joints.
  - The design shall design all anchors and guide supports as needed.
  - Seismic connectors for straight pipe runs to be designed with sufficient live length on each flexible leg to provide the minimum movement in directions as required by movement allowed at joint. Verify with structural total movement required in planes.

Approved Manufacturers:

- Isolation Equipment
  - Amber Booth
  - Mason
  - Vibrex
- Seismic Pipe Loops and Expansion Joints
  - Amber Booth
  - Mason
  - Metraflex
  - Vibrex

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

DESIGN STANDARD for Identification of HVAC Piping, Ductwork, and Equipment

Purpose:

The identification of heating, ventilating, and air-conditioning piping, ductwork, and equipment is an essential element of the mechanical systems. This design standard has the purpose of creating a consistent application of systems identification requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials and installation of mechanical systems identification for complete and operable systems.

- General: Adhere to ANSI A-13.1
- Ductwork
  - General: Provide for identification of air supply, return, exhaust, intake, and relief ductwork with stenciled signs and arrows, showing ductwork service and direction of flow, in black and white.
  - Locations: Ductwork shall be identified every 20’ in spaces with removable ceilings and at each access door in spaces with hard ceilings. Exposed ductwork shall be identified every 20’ in mechanical rooms. As described above, ductwork shall be labeled on both sides of floor and wall penetrations.
  - Access Doors: Provide engraved plastic-laminate signs on each access door in ductwork and housings, indicating purpose of access (to what equipment) and other maintenance and operating instructions, and appropriate and procedural information.
- Piping
  - Wrap around plastic identification. Include arrows to show normal direction of flow. For hot non-insulated pipes, install a segment of pipe insulation with appropriate piping identification.

- Locate identification as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (above removable ceilings and the like) and exterior non-concealed locations.
    - Near each valve and control device.
    - Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.
    - At locations where pipes pass through walls, floors, ceilings, or enter non-accessible enclosures.
    - At access doors, manholes and similar access points which permit view of concealed piping.
    - At major equipment items and other points of origination and termination.
    - Spaced intermediately at maximum spacing of 20’ in spaces with removable ceilings and at each access door in spaces with hard ceilings.
    - Identify non potable piping and outlets.
- Color code piping: Fire protection – red; Gas – yellow; All others – white with appropriate identification.

- Valve Identification
    - Provide for brass valve tags on every valve cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, plumbing fixture faucets, convenience and lawn-watering hose bibs, and shut-off valves at plumbing fixtures. HVAC terminal devices and similar rough-in connections of end-use fixtures and units. List each tagged valve in a valve schedule for each piping system.

- Mechanical Equipment Identification
    - Provide for engraved plastic laminate sign on or near each major item of mechanical equipment and each operational device. Provide signs for the following general categories of equipment and operational devices:
        - Main control and operating valves, including safety devices.
        - Meters, gauges, thermometers and similar units.
        - Fuel-burning units including boilers, furnaces, and heaters.
        - Pumps, compressors, chillers, condensers and similar motor-driven units.
        - Heat exchangers, coils, evaporators, cooling towers, heat recovery units and similar equipment.
        - Fans, blowers, primary balancing dampers and VAV boxes.
        - HVAC central-station and zone-type units.
        - Tanks and pressure vessels.
        - Air conditioning indoor and outdoor units.
        - AFD's and transmitters and Control Boxes.

Approved Manufacturers:

- Seton
- Brady

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

DESIGN STANDARD for Testing, Adjusting, and Balancing

Purpose:

The testing, adjusting, and balancing (TAB) of heating, ventilating, and air-conditioning systems is an essential element of the mechanical system turnover to the District. This design standard has the purpose of creating a consistent application of TAB requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, equipment and labor required for testing, adjusting, and balancing work required by this Standard, including air, hydronic systems, and associated equipment and apparatus. The work consists of setting speed and volume (flow) adjustments, recording data, conducting tests, preparing and submitting reports, and recommending modifications to work as required for complete and operable systems.

- All testing, adjusting, and balancing (TAB) shall be done in accordance with the National Environmental Balancing Bureau (NEBB) or Associated Air Balance Council (AABC).
- Environmental systems, including all equipment, apparatus, and distribution systems, shall be tested and balanced in accordance with the AABC or NEBB procedural standards. Fume hood testing shall be in accordance with the procedure outlined in the AABC manual.
- All instruments used for measurements shall be accurate, and calibration histories for each instrument shall be available for examination. Calibration and maintenance of all instruments shall be in accordance with the requirements of AABC or NEBB.
- Accuracy of measurements shall be in accordance with AABC or NEBB standards.
- In order to verify field capacities of plants, during the operating tests of the chilled water system and/or heating water system, the Contractor shall provide a false load equal to full capacity on the chiller plant/boiler plant and submit data on gpm flow, pressure drop, inlet and outlet temperatures of chilled water/hot water, amperage of chiller, capacity of gas load, and ambient air temperature at condenser.
- In addition, the Contractor shall check the operation of all automatic temperature control equipment; verify all thermostat, aquastat, airstat, etc., set-points and operations; and enlist the aid of the control subcontractor to make necessary adjustment where required.
- Reports:
  - Three copies of the final reports shall be submitted on applicable AABC or NEBB Reporting Forms for review and approval by the Design Consultant and the District.
  - Each individual final reporting form submitted shall bear the signature of the person who recorded the data and the signature of the testing and balancing supervisor of the performing firm.
  - If more than one certified firm performs the TAB work, all final reports shall be submitted by that certified firm having managerial responsibility.
  - Identification of all types of instruments used and their last dates of calibration shall be submitted with the final report.
  - The final test report shall include appropriate reference to all problems regarding the system(s) encountered prior to, during, and after testing and what action was taken to correct the problem(s), including noise and vibration problems.
  - Each report shall include a print (or sketch) reduced in size, showing all supply, return, and exhaust air outlets for easy reference to report data.
  - An approved copy of the balancing report shall be included in the maintenance manual submittal.

Approved Manufacturers:

Section not applicable

Substitutes Allowed:

Section not applicable

Associated Design Standards and Specifications

- All Division 23 Design Standards and Construction Specifications

DESIGN STANDARD for HVAC Insulation

Purpose:

The heating, ventilating, and air-conditioning insulation is an essential element of the mechanical systems. This design standard has the purpose of creating a consistent application of insulation requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials and installation of insulation, jackets and accessories for a complete and operable system.

- General:
  - Adhere to the requirements of the California Energy Code – Title 24, latest edition.
  - Insulation shall be applied on clean, dry surfaces and only after tests and approvals required by the specifications have been completed.
  - All pipe insulation on piping operating below ambient temperature shall be continuous through wall and ceiling openings and sleeves.
  - Insulation on all cold surfaces must be applied with a continuous, unbroken vapor seal. Hangers, supports, anchors, etc., that are secured directly to cold surfaces shall be adequately insulated and vapor sealed to prevent condensation.
  - Specified adhesives, mastics, and coatings shall be applied at the manufacturer's recommended minimum coverage per gallon.
  - Edges of vapor barrier insulation at valve stems, instrument wells, unions, and other raw edges shall be sealed adequately to prevent moisture from penetrating the insulation.
- Fire Hazard Ratings: All insulation shall have composite (insulation jacket and adhesive used to adhere the jacket to the insulation) Fire and Smoke Hazard ratings as tested under procedure ASTM E 84, NFPA 225, and UL 723.
- Insulation Protection Shields
  - To prevent crushing of insulation, insulation protection shields shall be installed at all pipe hangers and supports. Shields shall span an arc of 180°. Provide full size diameter hangers and shields (18 gauge minimum) for piping. Provide 18-inch long, non-compressible insulation section at insulation shields for lines 2 inches and larger.
- Insulation Jacketing
  - Provide aluminum jacketing for all piping located aboveground, outdoors.
- Ductwork
  - In general, duct system shall be insulated with fiberglass blanket. Insulation on all cold surfaces shall be provided with a vapor barrier jacket.
  - Ductwork requiring sound attenuation my utilize duct lining with mold, humidity, and erosion resistant surfaces compliant to UL 181.
- Piping
  - In general, piping systems shall be insulated with fiberglass piping insulation with an all-purpose jacket. Fittings, flanges, and valves shall be insulated with fiberglass inserts and premolded polyvinyl or PVC jackets.
  - Refrigerant piping systems shall be insulated with elastromeric pipe insulation.
  - Calcium silicate or high-temperature fiberglass shall be used in high temperature applications.
  - Special insulation protection shall be considered for areas subject to abuse and moisture, such as outside areas, washdown areas, public areas, and classrooms.
  - Removable insulated jackets shall be provided on all valves.
- Equipment: At a minimum, the following equipment shall be provided with insulation:
  - Air eliminators
  - Boilers
  - Chilled water pump bodies
  - Hot water storage tanks
  - Heat exchangers

- Cold surfaces of chillers
- Flue pipe
- Engine exhaust

Approved Manufacturers:

- Armacell LLC Armaflex
- Certainteed
- Johns Manville
- Knauf
- Owens-Corning Brady

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- All Division 23 Design Standards and Construction Specifications

DESIGN STANDARD for Variable Frequency Drives

Purpose:

The variable frequency drive is an essential element of variable flow mechanical systems. This design standard has the purpose of creating a consistent application of variable frequency drives throughout the Solano Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials and installation for a complete adjustable frequency motor drive consisting of a pulse width modulated (PWM) inverter for use on a standard NEMA Design B induction motor. Design drive specifically for variable torque applications.

- Drives to be UL Listed.
- Solid state, with a Pulse Width Modulated (PWM) output waveform enclosed in a NEMA 1 enclosure (provide other NEMA enclosures as required for application), completely assembled and tested by manufacturer. Employ a full wave rectifier (to prevent input line notching), DC Line Reactor, capacitors, and Insulated Gate Bipolar Transistors (IGBTs) as the output switching.
- Device drive efficiency: 97 percent or better at full speed and full load.
- Fundamental power factor: 0.98 at all speeds and loads.
- Door interlocked thermal magnetic circuit breaker disconnect handle, through-the-door type, and pad-lockable in the "Off" position.
- Provide all VFDs with the same customer interface, including digital display, keypad and customer connections; regardless of horsepower rating. The keypad is to be used for local control (start/stop, forward/reverse, and speed adjust), for setting all parameters, and for stepping through the displays and menus

Approved Manufacturers:

- ABB
- Siemens

- General Electric
- Danfoss
- Yaskawa
- Mitsubishi

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 23 05 13 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

DESIGN STANDARD for Facility Natural Gas Systems

Purpose:

The natural gas systems are an essential element of the mechanical heating and domestic water heating systems. This design standard has the purpose of creating a consistent application of natural gas system requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation, and testing of piping, valves, and appurtenances for natural gas systems for a complete and operable system.

- Gas meter to be installed at each new building, and at each existing building with first major renovation. This is to allow the District to monitor gas flow/consumption per building.
- Size gas piping for estimated maximum demand flow in CFH (using 1000 BTU per cubic foot) per code requirements.
- Steel Pipe (Above Grade Installation):
  - 2 Inches and Smaller: Schedule 40, A53 black steel pipe and threaded black malleable threaded fittings.
  - 2-1/2 Inches and Larger: Schedule 40, A53 black pipe with Schedule 40 butt weld fittings.
  - ASTM A53, electric-resistance welded (Type E) or seamless (Type S), Grade B, black, Schedule 40 pipe, manufactured for threaded or welded pipe connections.
- Steel Pipe (Exterior of Building Below Grade Installations)
  - 2 Inches and Smaller: Schedule 40, A53 black steel pipe and threaded black malleable threaded fittings.
  - 2-1/2 Inches and Larger: Schedule 40, A53 black pipe with butt weld fittings.
  - ASTM A53, electric-resistance welded (Type E) or seamless (Type S), Grade B, black, Schedule 40 pipe, manufactured for threaded or welded pipe connections.
  - Underground Steel Piping Corrosion Protection: Factory wrap un-insulated underground steel piping systems with protective coating composed of a coal-tar

Extend wrap not less than 3 inches above grade. Provide tinker test to check for holidays. Provide cathodic protection to meet requirements of NACE Standard RP0169-2002

- Polyethylene Pipe (Below Grade Installations at 30 psig and Less Only)
  - Polyethylene pipe, tubing and fittings furnished under this Specification shall conform to applicable provisions and requirements of the latest revision of the US Department of Transportation Pipeline Safety Regulations (CFR) Title 49, Part 192, "Transportation of Natural or Other Gases by Pipeline: Minimum Federal Safety Standards," and, by inclusion, appropriate standards referenced therein.
  - Piping shall be easily traced.
- Natural Gas Valves:
  - 2 Inches and Smaller: Ball valves. UL listed, two-piece construction, threaded, bronze body, conventional port, 250 PSI WOG working pressure
  - 2-1/2 Inches and Larger: 100 to 125 PSI rated, all bronze or iron body/bronze trimmed plug cock type, square head or tee/lever handle operation. CSA approved
- Natural Gas Pressure Regulators: Diaphragm and spring actuated type, with vented relief feature. Construction, pressure range and venting features suitable for intended service. Regulator to meet code and serving utility requirements. Pipe vented type to atmosphere in approved location.
- Provide shutoff valves, pressure regulators and unions at connections to gas-fired equipment. Provide dirt legs at low points.

Approved Manufacturers:

- Valves
  - Apollo
  - Jenkins Bros.
  - Lunkenheimer Co.
  - Nibco
  - Watts

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 22 00 00 - BASIC PLUMBING SYSTEM DESIGN
- 22 11 13 - GENERAL PLUMBING PIPING SYSTEMS
- 22 05 12 - PLUMBING PIPE AND FITTINGS

DESIGN STANDARD for Hydronic Piping Systems

Purpose:

The hydronic piping systems are an essential element of the mechanical heating and cooling systems. This design standard has the purpose of creating a consistent application of hydronic piping system requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation, and testing of pipes and pipe fittings for cooling tower water, chilled water, building heating water, make-up and drain, and valves for a complete and operable system.

- Manual vents are standard but automatic vents can be considered in special situations. Where vent location is high or otherwise inaccessible, the following procedure can be followed: Install valve at vent chamber, then extend 0.375-in. tubing to the nearest janitor sink or mechanical room floor drain and terminate with a ball valve. Use automatic water feed set to maintain proper system pressure. Add cold water makeup at the air vent line above an air-eliminating device.
- Glycol systems shall be equipped with a mix-and-fill tank with manual fill capabilities, hose bib from domestic water for tank filling, and tank level alarm. Direct-connect city makeup lines to glycol systems are NOT permitted.
- Provisions shall be made for draining and air venting of all water coils.
- Closed Loop Water Treatment: All new hot water and chilled water systems that are independent of the central systems shall be arranged for shot feed chemical treatment. In each such system, the equivalent of one Calgon 100L Mircomet pot feeder shall be provided, including pressure gage and flow indicator. The pot feeder to the system shall be hard-piped; using a hose is NOT acceptable.
- Open Tower Water Treatment: All new open loop cooling tower systems shall be provided with a non-chemical treatment system similar to the EnviroTower system.
- After all items of equipment have been connected to the system, the hot and chilled water system shall be chemically cleaned as follows:
  - Drain and refill the system using trisodium phosphate, 1 lb for every 50 gal in the system.
  - Fill, vent, and circulate the system with this solution, allowing it to reach design or operating temperatures.
  - After circulating a few hours, the system should be drained completely, strainers removed and cleaned, dirt legs and pockets opened and cleaned, and then refilled with fresh water.
  - Reduced pressure principal backflow preventers shall be installed on all make-up water lines. Drains shall be piped to the nearest floor drain
- Chilled Water:
  - Pipe Sizes 2-1/2 Inches and Larger: Steel, Schedule 40 with welded or mechanical coupling fittings, copper tubing, type L.
  - Pipe Sizes, 2 Inches and Smaller: Steel, Schedule 40 with threaded fittings, copper tubing, type L.
  - Drain Pipe: Steel, Schedule 40, threaded fittings; copper tubing, type M, soldered fittings
- Heating Water:
  - Pipe Sizes 2-1/2 Inches and Larger: Steel, Schedule 40 with welded fittings, copper tubing, type L.
  - Pipe Sizes, 2 Inches and Smaller: Steel, Schedule 40 with threaded fittings, copper tubing, type L.
  - Drain Pipe: Steel, Schedule 40, threaded fittings; copper tubing, type M, soldered fittings
- Cooling Tower:
  - Pipe Sizes 2-1/2 Inches and Larger: Steel, Schedule 40 with welded, flanged or mechanical coupling fittings.
  - Pipe Sizes, 2 Inches and Smaller: Steel, Schedule 40 with threaded fittings, copper tubing, type L.

- Pressurized Steel Pipe:
  - ASTM A-53-84a, Electric Resistance Welded or Seamless, Grade B: Black, unless otherwise indicated, schedule as specified.
  - ASTM A-135-84, Schedule B: Black unless otherwise specified, schedule as specified
- Manual air vent valves.
  - Operated manually with screwdriver or thumbscrew, 1/8-inch NPS or 1/4-inch NPS connection as require
- Automatic air vent valves.
  - Float type with pressure rating equal to or greater than the system in which it is installed
- Automatic flow control valves.
  - General: Pressure independent design, constructed to provide constant flow over a range of differential pressures, with field adjustable control point.
  - Accuracy: Plus or minus 5 percent.
  - Flow Characteristic. Smooth, continuous curve, void of abrupt changes over the entire range of operation.
  - Construction: Brass body, EPDM O-ring seals, abrasion resistant and non-corrosive thermoplastic cartridge, 1/8-inch pressure ports.
  - Flow adjustment: External adjustment via removable key and numeric dial indicator. Indicator reading to match manufacturer's data chart for calibration and flow reading
  - Pressure/Temperature Rating: 230 PSIG/248F
- Strainers
  - Full line size strainers with ends matching connecting piping materials, machined screen seats, gasketed cap, blow off outlet, minimum 2-1/2 to 1 open area ratio, and Type 304 stainless steel screens with 1/16-inch diameter holes
- Air separators.
  - Line size, pressure rated for 125 PSI. Construct sizes 1-1/2 inches and smaller of cast iron, and sizes 2 inches and larger of steel complying with ASME Boiler and Pressure Code and stamped with the "U" symbol
- Expansion tanks.
  - Welded steel, constructed, tested and stamped in accordance with Section VIII of ASME Boiler and Pressure Vessel Code for working pressure of 125 PSI. Furnish National Board Form U-1 denoting compliance. Support vertical tanks with steel legs or base. Provide single flexible diaphragm securely sealed into tank to separate air charge from system water, to maintain design expansion capacity. Provide pressure gauge and air-charging fitting, and drain fitting. Diaphragm: Removable and replaceable in line
- Liquid flow switches.
  - Brass for all wetted parts, with packless construction, paddle with removable segments for pipe size and flow velocity, vaporproof electrical compartment for switches mounted on cold hydronic piping systems, switches for 115V, 60 Hz, 1-phase with 7.4A rating
- Water pressure relief valves.
  - Size and capacity as selected by installer for proper relieving capacity, in accordance with ASME Boiler and Pressure Vessel Code.
  - Combined Pressure-Temperature Relief Valves: Bronze body, test lever, thermostat, complying with ANSI Z21.22 listing requirements for temperature discharge capacity. Provide temperature relief at 210F, and pressure relief at 125 PSI.
  - Pressure Relief Valves: Bronze body, test lever, ASME rated. Provide pressure relief at 30 PSI
- Water pressure reducing valves.
  - Cast iron or brass body, inlet check valves, inlet strainer removable without system shut down, non-corrosive valve seat and stem factory set at operating pressure required
- Thermometers
  - 3-inch diameter bimetal dial thermometer, stainless steel case, white dial, black numbers, 4-inch stainless steel stem, brass separable socket. Back or bottom connections as required.

Service	Range
Heating Water	50 to 300F
Chilled Water	0 to 120F
Condenser Water	50 to 150F

- Thermometer wells
  - Brass or stainless steel, pressure rated to match piping system design pressure. Provide extensions for insulated piping of length required to extend above insulation used at each location. Provide cap nut with chain fastened permanently to thermometer well
- Pressure gages
  - Type: General use, 1 percent accuracy, ANSI B40.1, Grade A, phosphor bronze bourdon type, bottom connection.
  - Case: Drawn steel or brass, glass lens, 4-1/2-inch diameter.
  - Connector: Brass with 1/4-inch male NPT.
  - Scale: White coated aluminum, with permanently etched markings.
  - Range:
  - Pump Suctions: 30-inch Hg - 60 PSI.
  - Water: 0 - 100 PSI.
- Differential Pressure Switches
  - Sensing Range: 0- to 1.0-inch water column. Diaphragm operated with switching accomplished by photocell controlled relays, adjustable switch setpoints that close contacts on the relay if the differential pressure sensed raised above the setpoint, incorporate a pointer type gauge with divisions of 0.02-inch W.C.
- Instrument probe fittings
  - Brass or stainless steel body and cap, high pressure rated, valve material neoprene, Nordal or Viton to suit temperature range, 1/4 inch or 1/2-inch NPT tailpiece.
- Expansion joints
  - Furnish and install controlled flexing expansion joints where shown or required. Expansion Joints: Minimum of 150 PSI working pressure.
  - For copper piping, 3/4 inch through 3 inches, use Type HB, 1-3/4-inch traverse two-ply stainless steel bellows, traveling nipple extended through bellows and guided each end, integral shroud, screwed steel ends.
  - For steel piping, 1-1/2 inches through 8 inches externally pressurized. 4-inch traverse, 150 PSI working pressure, stainless steel bellows, 150 PSI flanged ends, furnish insulation shroud
- Pipe guides
  - Install where using expansion joints to avoid pipe buckling
- Pipe anchors
  - Install where using expansion joints to avoid pipe displacement

Approved Manufacturers:

- Manual air vent valves.
  - Armstrong
  - Bell & Gossett
  - Hoffman
  - Spirax
  - Sarco
- Automatic air vent valves.
  - Taco
  - Bell & Gossett
  - Hoffman
- Automatic flow control valves.
  - Griswold
  - Taco
  - Bell & Gossett
- Strainers
  - Mueller
  - Armstrong

  - Hoffman
  - Wheatley
  - Victaulic (where mechanical couplings are allowed)
- Air separators.
  - Amtrol
  - Armstrong
  - Bell & Gossett
  - Taco
  - Wheatley
- Expansion tanks.
  - Mueller
  - Amtrol
  - Armstrong
  - Taco
  - Bell & Gossett
- Liquid flow switches.
  - McDonnell & Miller
  - Dwyer
- Water pressure relief valves.
  - Amtrol
  - Bell & Gossett
  - Spirax Sarco
  - Watts Regulator
- Water pressure reducing valves.
  - Amtrol
  - Armstrong Pumps
  - Bell & Gossett
  - Taco
- Thermometers
  - Ashcroft
  - Trerice
  - Weiss
- Thermometer wells
  - Ashcroft
  - Trerice
  - Weiss
- Pressure gages
  - Amtek/U.S. Gauge
  - Ashcroft, Palmer
  - Marshaltown Instruments
  - Trerice
  - Weiss
  - Weksler
- Expansion joints
  - Flexonics
  - Mason Industries
  - Amber-Bush
  - Metraflex
- Pipe guides
  - Flexonics

  - Mason Industries
  - Amber-Bush
  - Metraflex
- Pipe anchors
  - Flexonics
  - Mason Industries
  - Amber-Bush
  - Metraflex

Substitutes Allowed:

Approved manufacturer or approved equal

Associated Design Standards and Specifications

- 23 05 10 – HVAC PIPING
- 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
- 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

DESIGN STANDARD for Heating Water Systems

Purpose:

The heating water systems are an essential element of the mechanical space heating systems. This design standard has the purpose of creating a consistent application of heating water system requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation, and testing of heating water system for a complete and operable system.

- Radiant Ceiling Panels
  - Design complete radiant heating/cooling ceiling system. The radiant panels consist of 0.040-inch aluminum faceplate, 1/2-inch ID copper serpentine coil metallurgically bonded to face plate, with a 1-1/2-inch thick, 3/4 lb. density glass fiber acoustic pad installed over panels. Panel interconnecting piping to be Type "L," soft copper, with wrought bronze or hard temper connection to valved outlets in the radiant panel circulating system. Panel finished with baked enamel finish
  - Panels to be designed as an installed system with the supplier providing interconnecting piping and the pipe between the panel system and the control valve
- Hot water heating coils:
  - Designed to be counter-flow
  - Coil construction (downstream of air handlers): copper coils, aluminum fins
  - Coil construction (inside of air handlers): copper coils, aluminum fins
  - Coil construction (Solano, exposed to outdoor air): copper coils, copper fins
- Horizontal hydronic unit heaters
  - Blow through unit with heating water coil, propeller fans with motor, three-speed switch, 18 gauge galvanized steel casing, fan guard, adjustable discharge louvers

  - Coils: 1/2-inch OD copper tubes with aluminum fins mechanically bonded to the tubes, 5/8-inch OD male sweat fittings. Coils are leak tested at 350 PSIG minimum air pressure, suitable for working pressures up to 250 PSIG with air vents
  - Motors: Permanent split capacitor type with built-in thermal overload protection
- Cabinet Heaters:
  - Blow-through design with direct drive motor and forward curved double inlet fans in the airstream below the coil. Internal surfaces are either painted or are constructed of galvanized steel. Baked enamel finish on cabinet
  - Heating water constructed of copper tubing mechanically expanded into aluminum fins. Joints are brazed with high temperature silver alloy
- Hot Water Convectors
  - Partially or fully recessed cabinet constructed of 16 gauge steel. Fasteners to be tamperproof Allen-Head machine screws. Access doors flush mounted with tamperproof latches. Exposed corners to have formed 1-inch radius cabinet to be phosphatized and painted inside and out with baked on primer and baked enamel finish
  - Grilles to be die-cast formed with directional louvers
  - Heating element to consist of 1/2-inch OD copper tube and aluminum fins and 1-1/4-inch steel headers. Test heating element at 200 PSI hydrostatic pressure
- Finned Tube Radiator
  - Copper Aluminum Elements: Manufacture copper aluminum heating elements of seamless copper tube permanently bonded to aluminum fins by a mechanical process
  - Provide enclosure
- Heat Exchangers
  - Plate and Frame Exchanger: Pressure plate and frame supporting heat transfer plates to be carbon steel. Heat transfer surfaces to be corrugated Type 304 stainless steel. Piping connections to be ANSI flanges. Minimum 150 PSIG working pressure to conform to ASME rules for pressure vessels. Install as recommended by manufacturer and provide adequate clearance for cleaning

Approved Manufacturers:

- Radiant Ceiling Panels
  - Airtex Corporation
  - TROX
- Hot water heating coils
  - Trane
- Horizontal hydronic unit heaters
  - Trane
- Cabinet Heaters
  - Trane
  - Carrier
- Hot Water Convectors
  - Trane
- Finned Tube Radiator
  - Trane
- Heat Exchangers
  - Bell & Gossett
  - Taco

Substitutes Allowed:

Approved manufacturer or approved equal

Associated Design Standards and Specifications

- 23 05 10 – HVAC PIPING
- 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

DESIGN STANDARD for Chilled Water Systems

Purpose:

The chilled water systems are an essential element of the mechanical space cooling systems. This design standard has the purpose of creating a consistent application of chilled water system requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation, and testing of chillers and cooling towers for building cooling and associated accessories for a complete and operable system.

- All chilled water systems shall have refrigerant systems that meet all LEED requirements for refrigerant use with regards to ozone depletion and global warming.
- Air-Cooled Chiller:
  - Air-cooled, reciprocating or screw type, dual independent refrigerant circuits with lead-lag switch, assembled at the factory on a steel base. Individual performance test at full and part load conditions. Units to be leak tested and provided with a full operating charge of refrigerant
  - Design on Solano campus shall provide casing and all components in contact with the outdoor environments to be corrosion resistant
  - Design with integration to campus wide control system
- Evap-Cooled Chiller:
  - Evap-cooled, reciprocating or screw type, dual independent refrigerant circuits with lead-lag switch, assembled at the factory on a steel base. Individual performance test at full and part load conditions. Units to be leak tested and provided with a full operating charge of refrigerant
  - Design on Solano campus shall provide casing and all components in contact with the outdoor environments to be corrosion resistant
  - Design with integration to campus wide control system
- Water-Cooled Chiller:
  - Water cooled, centrifugal type, assembled at the factory on a steel base. Individual performance test at full and part load conditions. Units to be leak tested and provided with a full operating charge of refrigerant
  - Locate indoors in a refrigeration machinery rooms
  - Design with variable frequency drive
  - Design with integral touch screen control panel
  - Design with integration to campus wide control system
- Induced Draft Counterflow Cooling Tower:
  - Factory assembled, sectional, counterflow, induced draft design. Fan assemblies built completely into the pan with moving parts factory mounted and aligned.
  - All steel components: Hot-dip galvanized steel with cut edges given a protective coat of zinc-rich compound, with a final coating of zinc chromatized aluminum.
  - Stainless steel sumps.
- Ice Storage Systems:
  - Installed in manufacturers steel tanks or underground insulated concrete tanks.
  - Contained within the tank shall be a steel heat exchanger that is constructed of 1.05" O.D., all prime surface serpentine steel tubing encased in a steel framework. The coil, which is hot-dip galvanized after fabrication, shall be pneumatically tested at 190 psig and rated for 150 psig operating pressure. The coil circuits are configured to provide maximum storage capacity. The coil connections on the unit are galvanized steel and are grooved for mechanical coupling.
- Heat Exchangers
  - Plate and Frame Exchanger: Pressure plate and frame supporting heat transfer plates to be carbon steel. Heat transfer surfaces to be corrugated Type 304 stainless steel. Piping connections to be ANSI flanges. Minimum 150 PSIG working pressure to conform to ASME rules for pressure vessels. Install as recommended by manufacturer and provide adequate clearance for cleaning

Approved Manufacturers:

- Air-Cooled Chiller:
  - Trane
  - Carrier
  - York
- Evap-Cooled Chiller:
  - Governair
- Water-Cooled Chiller:
  - Trane
  - Carrier
  - York
- Induced Draft Counterflow Cooling Tower:
  - BAC
- Ice Storage Systems:
  - BAC
- Heat Exchangers
  - Bell & Gossett
  - Taco

Substitutes Allowed:

Air-Cooled Chiller and Water-Cooled Chiller: No substitutes allowed.

Other items: Approved manufacturer or approved equal.

Associated Design Standards and Specifications

- 23 05 10 – HVAC PIPING
- 23 05 53 – IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

DESIGN STANDARD for Hydronic Pumps

Purpose:

The hydronic pumps are an essential element of the mechanical space cooling and heating systems. This design standard has the purpose of creating a consistent application of hydronic pump requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation and testing of pumps for a complete and operable system.

- General:
  - Factory-tested pumps cleaned and painted with enamel prior to shipment. Do not install any pumps at Solano College in contact with the outdoor environment.
  - All pumps shall have bronze impellers.
  - A single gage shall be connected to the discharge and suction side of each pump and across the strainer so that the differential pressure can be observed.
- Pumps – Closed Coupled
  - Closed-coupled pumps are not permitted over 0.5 hp.
- Pumps – Base Mounted, End Suction
  - Pumps shall be electric-motor-driven, centrifugal, single-suction, single-stage pumps. Pumps shall be bronze fitted, with bronze impeller, with close-grained semi-steel vertically split casing (125 psi), provided with mechanical seals designed for the operating conditions shown on the plans. Pumps shall be provided with sleeve bearings and an oil reservoir. A drop-out coupling shall be provided.
  - Pumps shall have a sleeve bearing, specially selected for quiet operation at 1750 rpm. The motor size shown on the drawing shall be the minimum acceptable. A pump motor should operate within the service factor of the motor, providing that the service factor is acceptable to the pump manufacturer. The motor shall not exceed the nominal hp at the specified delivery and head.

  - Discharge increasers shall be concentric and located at the pump discharge nozzle. Suction pipe reducers shall be eccentric, located at the pump suction nozzle and at least five diameters of straight pipe shall be installed before the inlet or along the sweep elbow. (Suction diffusers in lieu of straight pipe section may be used.) A 0.75-in. drain shall be provided from each base plate to the nearest floor drain.
  - Pumps shall be selected so that the ratio of impeller diameter to the maximum diameter possible in the casing shall not exceed 0.85. A purge cock shall be provided in the casing and gage tappings shall be provided in pump suction and discharge.
  - All piping connections to pumps shall be supported independently so that no strain is imposed on the pump casing.
  - Pumps installed on “slab-on grade” shall be mounted on a 6-in. high concrete pad with anchor bolts. The space between pad and base shall be grouted to eliminate all voids.
  - Pumps shall have rear pull-out design for removal of the impeller without disturbing the motor alignment or piping.
  - Pumps installed on supported slabs shall be provided with concrete inertia subbases with spring isolators.
- In-Line Pumps
  - Pumps shall be centrifugal and single-stage, complete with motor, mechanical seals, bronze fittings, bronze impellers, and a flexible coupler with safety guard. The pumps shall also be dynamically and hydraulically balanced.
  - The pump motor shall be supported independently.

Approved Manufacturers:

- Pumps – Base Mounted, End Suction
  - Bell & Gossett
  - Taco
  - Paco
- In-Line Pumps
  - Bell & Gossett
  - Taco
  - Paco

Substitutes Allowed:

Approved manufacturer or approved equal.

Associated Design Standards and Specifications

- 23 05 10 – HVAC PIPING
- 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
- 23 21 05 - HYDRONIC PIPING SYSTEMS

DESIGN STANDARD for Ductwork

Purpose:

Ductwork is an essential element of the mechanical space cooling and heating systems. This design standard has the purpose of creating a consistent application of ductwork requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation and testing of HVAC ductwork and accessories, including the following:

- » Heating and air conditioning supply and return systems
- » Outside air systems
- » Exhaust systems
- » Ductwork hangers
- » Plenums
- » Gas vents

- Galvanized Steel Ductwork: Carbon steel, lock-forming quality, hot-dip galvanized, with spangle-type zinc coating, double seam without showing fracture. Conform to ASTM A525 and A527.
- ASHRAE and/or SMACNA shall be used as a guide.
- Design medium pressure ductwork at 0.1”/100’ pressure drop
- Design low pressure ductwork at 0.08”/100’Pressure classification shall be specified on the drawings.
- All metal ductwork shall be crossbroke to ensure rigidity.
- Inlet and discharge ductwork configuration shall conform to the SMACNA HVAC Duct Design Manual.
- Seismic restraints shall be designed per SMACNA requirements
- All ductwork located outdoors shall be designed to be waterproof and sloped for water run-off
- Flexible ducts:
  - Standard factory fabricated product, construct an inner wall of impervious vinyl or chlorinated polyethylene, permanently bonded to a vinyl or zinc-coated spring steel helix. Cover the assembly with fiberglass blanket insulation covered by an outer wall of vinyl or fiberglass-reinforced metalized vapor barrier. UL 181 listed Class 1 flexible air duct material. Overall thermal transmission no more than 0.25 (BTU/in)/(hr/sq.ft./deg. F) at 75F differential, per ASTM C335. Vapor transmission value no more than 0.10 perm, per ASTM E96. Rated for a minimum of 4-inch w.g. positive pressure and 1-inch w.g. negative pressure. Air friction correction factor of 1.3 maximum at 1000 FPM. Working air velocity of at least 2000 FPM. Flame spread rating no more than 25. Smoke development rating no more than 50 as tested per ASTM E84. Must have cataloged data on insertion loss characteristics, minimum attenuation of 29 DB for 10-foot straight length at 8-inch diameter and 500 Hz.
  - Install flexible duct with bend radius equal to 1.5 times the diameter. Minimum length 2 feet. Maximum length 5 feet.
  - Provide round neck grilles/diffusers or square-to-round transitions. No flex duct connections directly to square neck allowed.
  - Flex duct allowed only for vertical drops to diffusers. Maximum offset angle from vertical: 30 degrees.
  - Approved for use on supply ducts only; not allowed for return or exhaust.
  - Flex duct allowed in concealed spaces above lay-in ceilings only
- Positive pressure gas vents:
  - Doublewalled insulated piping system. Construct the inner wall of at least 0.035-inch-thick Type 304 stainless steel. Construct the outer wall of at least 0.025-inch-thick aluminized steel. Fabricate duct to provide space between the inner and outer walls of at least 1 inch. List system by UL as 1400F Factory Built Chimneys with 2-inch clearance to combustibles for use with No. 2 fuel oil-fired equipment. Join sections by means of a system, capable of sealing gastight to pressure up to at least 60-inch w.g. for temperatures up to 600F. Fittings of the same manufacture and construction as the straight sections

- Gravity gas vents:
  - Type "B" factory fabricated, UL listed, doublewall flue, with aluminum inner wall, galvanized steel outer wall and 1/2-inch air space between unless noted otherwise. Provide twist-lock connectors, tall cone flashing, storm collar, and round birdproof/weatherproof top

Approved Manufacturers:

- Flexible ducts
  - J. P. Lamborn Co.
  - Norflex
  - Clevaflex
  - Genflex
  - Atco
  - Flexmaster
  - Thermaflex
- Positive pressure gas vents
  - Ampco
  - Selkirk
  - Metalbestos IPS
- Gravity Gas Vents
  - Ampco
  - Selkirk
  - Metalbestos IPS

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
- 23 05 48 - VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT
- 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

DESIGN STANDARD for Ductwork Accessories

Purpose:

Ductwork is an essential element of the mechanical space cooling and heating systems. This design standard has the purpose of creating a consistent application of ductwork requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation, and testing of HVAC duct accessories such as volume dampers, splitter dampers, adjustable deflectors, duct access doors, backdraft dampers, fire dampers, duct silencers, spin-in fittings, and smoke dampers

- Volume Dampers
  - Construct of galvanized sheets not lighter than 18 gauge, reinforced to prevent vibration, equipped at both ends with brass bearing mounts and of sufficient length to provide a complete shutoff of the duct
  - Provide each damper with an adjustment and locking quadrant device for accessible locations, or remote type for non-accessible locations. Provide operating rod and attaching devices as required. Provide raised platform for insulated duct
- Barometric Dampers (Large): Frame and blades fabricated from 0.063 mill finish aluminum. Blades have polyurethane edge seals. 1/2-inch diameter aluminum blade shafts with bronze bearings. Adjustable counterweight. Blades start to open at 0.05-inch APD - 55 FPM. Blades fully open at 0.06-inch APD - 680 FPM.
- Backdraft Dampers (small): All welded 14 gauge aluminum, with blades pivoting off center, double crimped front and rear, polyurethane seals. Link blades to work in unison, pivoting in ball bearings, and provide adjustable counterweights attached to the blades. . Blades start to open at 0.05-inch APD - 55 FPM. Blades fully open at 0.06-inch APD - 680 FPM. Frames: Channel type with flanges to facilitate mounting.
- Control Dampers: Provide automatic control dampers as indicated. Airfoil, multiblade type, maximum blade length of 48 inches. Provide parallel blades for positive or modulating mixing service and opposed blades for throttling service. Blades to be interlocking, minimum 16 gauge galvanized steel. Damper blades reinforced, have continuous full length axle shafts and/or operating jackshafts as required to provide coordinated tracking of blades. Dampers over 25 sq.ft. in area to be in two or more sections, with interconnecting blades. Dampers to have a maximum air leakage of 15 CFM psf at 4-inch w.g. pressure. Provide automatic dampers except those specified with units.

- Fire smoke damper: Motorized fire/smoke damper with motor. 22 gauge roll from galvanized steel with a 120VAC motor for motorized operation. Standard UL 212F fusible link. Provide smoke detector at each damper per code. Dynamic type. The fire dampers to be U.S. standard for 1-1/2 hour listing. Motors to be UL listed. Provide the thermal protection via the fusible link. Damper to be normally closed. Minimum leakage Class II damper. Provide with automatic reset. Damper to fail closed when power is interrupted to actuator.
- Filters: Provide minimum Merv-13 filters for LEED projects. Size for maximum velocity of 500 feet per minute. Filters shall be standard dimensions.
- Moisture eliminators: stainless steel moisture eliminator media, contained in an all stainless steel frame. Provide at all outside air intakes for equipment at Solano College.

Approved Manufacturers:

- Volume dampers
  - Ruskin
  - Greenheck
  - Penn
  - Nailor
  - Cesco
- Backdraft dampers
  - Ruskin
  - Greenheck
  - Cesco
  - Louvers & Dampers
  - Prefco

- Control dampers
  - Ruskin
  - Greenheck
  - Louvers & Dampers
  - Prefco
  - Cesco
- Fire Smoke Dampers
  - Ruskin
  - Greenheck
  - Penn
  - Nailor
  - Cesco
- Filters
  - American Air Filter

- Control Damper Actuators
  - Belimo
  - Delta

Substitutes Allowed:

Approved manufacturer or approved equal.

Associated Design Standards and Specifications

- 23 31 00 - DUCTWORK

DESIGN STANDARD for Fans

Purpose:

Fans are an essential element of the mechanical space ventilation, cooling, and heating systems. This design standard has the purpose of creating a consistent application of fan requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation, and testing of fans used for ventilation and exhaust service for a complete and operating system

- Fans shall be AMCA rated for sound and air performance.
- All fans shall be statically and dynamically balanced and test run at the factory.
- The motor horsepower shall not be less than 120% of fan bhp, non-overloading.
- Where variable speed drives are utilized, consider use of direct drive fans to reduce maintenance for belts. Consider fan's critical speed in selection of direct drive fans with variable speed operation.
- Fan types shall include but not be limited to:
  - Sidewall exhaust fans
  - Centrifugal belt drive roof exhaust fans
  - Utility sets
  - Inline cabinet fans
  - Plug fans
  - Wall propeller exhaust fans
  - Transfer filter fans
  - Duct mounted inline fans
  - Air curtains

- Dust Collectors
  - Design with material handling exhaust fan, heavy duty cotton sateen filters, explosion vent, (top mounted discharge silencer if required for acoustical attenuation) dust storage hopper. Housing of 14 gauge hot rolled steel base with extended legs providing 42 inch clearance below hopper. Paint Finishes: One coat zinc chrome primer on interior and one coat grey machinery enamel on exterior.
  - Heavy duty industrial type material handing direct drive exhaust fan.
  - Filters: High efficient cotton sateen fabric with an efficiency rating of 99.9 percent by weight, allowing recirculation of the air. The filter pockets must have a metal insert to prevent the filter from collapsing and to maintain a positive connection to the filter shaker during the cleaning cycle. Foam inserts will not be allowed.
  - Motorized shaker complete with motor. Solid state field adjustable controller governing shaking cycle duration, automatically actuated at each fan shutdown. Shaker must be high frequency type for maximum cleaning.
  - Factory mounted and wired NEMA 4 control panel including magnetic starters with heaters for the blower motor and shaker motor. Single point electrical connection, provide for field wiring required for internally mounted start/stop station supplied by factory.
  - Explosion vent designed for vacuum service to be supplied with the dust collector for field installation. The explosion vent is to be the same diameter as the main duct and installed in "T" connection at the highest point prior to entering the dust collector.
- Energy Recovery Units
  - General: Outdoor heat recovery ventilator designed for rooftop or indoor mounting with separate supply and exhaust blowers.
  - Weatherproof, galvanized steel frame and panels, with 18 gauge steel where panels are exposed to the weather. Overlapping top seams. If used at Solano College, casing shall be corrosion resistant.
  - Provide moisture eliminator testing in accordance with AMCA Standard 500-L to prevent water penetration up to 3 inches per hour at 29 miles per hour.
  - Insulation: 1-inch fiberglass, meeting UL 181 erosion requirements.
  - Energy Recovery Wheel: Silica gel enthalpy type and ARA certified to Standard 1060. Polymer media construction. Drive Belt: High strength urethane.
  - Access Doors: Removable for servicing components.
  - Roof Curb: Weathertight with gasket and designed to carry gravity and seismic loads.

Approved Manufacturers:

- Fans
  - Greenheck
  - Cook
  - Penn
  - Twin Cities
- Air curtains
  - Mars
  - Dravo Corporation
  - Berner International
- Dust collectors
  - Sternvent
  - Torit
  - American Air Filter
- Energy recovery units
  - Greenheck
  - Innovent
  - Aaon
  - Haakon

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
- 23 05 48 - VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT
- 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
- 23 05 93 - TESTING, ADJUSTING AND BALANCING
- 23 31 00 - DUCTWORK

DESIGN STANDARD for Air Terminal Units

Purpose:

Air terminal units are an essential element of the mechanical space ventilation, cooling, and heating systems. This design standard has the purpose of creating a consistent application of air terminal unit requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation and testing for variable air volume terminal units, including reheat central air terminals for a complete and operating system

- Variable air volume (VAV) systems shall typically be zoned so that three to five offices are ganged on a temperature sensor. Offices grouped together shall be ganged in a logical manner, such as having the same floor area, building face exposure, and similar internal loads. Corner zones shall always be an independent zone not connected to any other rooms.
- VAV boxes shall have a minimum position setting for ventilation air requirements.
- Use of reheat coils shall be limited to hot water reheat coils. Utilize two row coils only where necessary to meet space temperature loads. 5/8-inch OD seamless copper tubes mechanically expanded to aluminum fins. 150 PSIG working pressure. Sweat connections.
- VAV boxes with perimeter radiation shall be sequenced from the same room temperature sensor to ensure that the systems do not “fight” each other.
- VAV boxes that are DDC type shall have factory-installed controls. Controls are to be furnished by the controls contractor.
- When multiple boxes are used to serve a single zone, all shall be controlled from a single thermostat.
- Location of all boxes shall be accessible for maintenance.
- Box controls shall be pressure independent.

Approved Manufacturers:

- Air terminal units
  - Trane
  - Titus
  - Tuttle & Bailey
  - Krueger
  - Price
  - Carnes
  - Nailor

Substitutes Allowed:

Approved manufacturer or approved equal.

Associated Design Standards and Specifications

- 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
- 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
- 23 05 93 - TESTING, ADJUSTING AND BALANCING
- 23 31 00 – DUCTWORK

DESIGN STANDARD for Air Outlets and Inlets

Purpose:

Air outlets and inlets are an essential element of the mechanical space ventilation, cooling, and heating systems. This design standard has the purpose of creating a consistent application of air outlets and inlets throughout the Solano Community College District therefore achieving a standard of quality for maintenance and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation, and testing of HVAC outlets and inlets for a complete and operating system

- Where possible, balancing dampers shall be located at the branch take-off instead of at the diffuser to reduce air noise. Where this is not possible, the damper at the diffuser shall be screwdriver operated
- Grilles, registers, and diffusers:
  - Indicate 1-, 2-, 3-, or 4-way deflection so as to reduce chances of drafts
  - Coordinate mounting frames with construction types per finish schedule
  - Provide components that have velocity, throw and drop, and noise criteria ratings for each size device as listed in manufacturer's current standard literature, which are plus or minus 10 percent of the components as listed in the Diffuser, Register and Grille Schedule, or as specified herein
- Gravity intake and relief penthouses:
  - Stormproof, gravity type. Penthouse: Aluminum or fiberglass. Cover: Removable and lined with fiberglass insulation to prevent condensation. Provide birdscreen, roof curb, and anti-condensation coating

Approved Manufacturers:

- Grilles, registers, and diffusers:
  - Titus

  - Tuttle & Bailey
  - Krueger
  - Price
  - Carnes
  - Nailor
- Gravity intake and relief penthouses
  - Acme
  - Breidert
  - Carnes
  - Greenheck
  - JencoFan
  - ILG
  - Cook
  - Penn

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 23 05 93 - TESTING, ADJUSTING AND BALANCING
- 23 31 00 – DUCTWORK

DESIGN STANDARD for Heating Boilers and Accessories

Purpose:

The boiler systems are an essential element of the mechanical space heating systems. This design standard has the purpose of creating a consistent application of boiler requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation, and testing of hot water boilers for building heating, and associated accessories for a complete and operable system.

- Boilers shall be located under cover for protection from tree debris and rain. It is preferable for all boilers to be located indoors.
- Boilers shall be located at grade level at a point accessible by hand truck from a service vehicle.
- Condensing boilers are not acceptable due to high maintenance cost.
- Furnish with trim per California Fired Pressure Vessel Safety Order (Title 17) including dual low water cut outs, dual gas valves.
- Automatic reset low water cut out shall include automatic feed for increased safety (McDonald-Miller or equal).
- Provide line pressure manual quick fill valve.
- Boilers 100,000 BTUH and smaller.
  - Cast iron or steel tube with atmospheric burners.
  - 80% minimum thermal efficiency
- Boilers 100,000 BTUH to 2,000,000 BTUH
  - Copper fin or steel tube with atmospheric burners
  - 80% minimum thermal efficiency
  - Access required to fire box, control panel, Low Water Cut Outs.

- Boilers 2,000,000 BTUH and Greater
  - Boiler permit required from air pollution control district as required.
  - Provide Powered Burners If low NOX is required.
  - Provide Best Available Control Technology (BACT) for NOX emissions.
  - Steel or fire tube design acceptable.
  - 80% minimum thermal efficiency

Approved Manufacturers:

- Boilers
  - Clever Brooks
  - Kawahnee
  - Ajax
  - Rite
  - Lochinvar
  - Raypack

Substitutes Allowed:

Approved manufacturer or approved equal.

Associated Design Standards and Specifications

- 23 05 10 – HVAC PIPING
- 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
- 23 21 05 - HYDRONIC PIPING SYSTEMS

DESIGN STANDARD for Refrigeration

Purpose:

The refrigeration systems are an essential element of the mechanical cooling systems. This design standard has the purpose of creating a consistent application of refrigerant system requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation and testing of refrigeration devices for air conditioning applications for a complete and operable system.

- All refrigerant systems shall have refrigerant systems that meet all LEED requirements for refrigerant use with regards to ozone depletion and global warming.
- Refrigerant liquid and suction piping shall be type L, hard drawn ACRS tubing.
- A nitrogen purge shall be maintained when soldering all joints. Copper-to-copper joints shall be made with a brazing alloy similar to Sil-Fos. Copper-to-brass joints shall be made with silver solder.
- Main piping fittings for dryers, sight glasses, expansion valves, and controls shall be flare or compression-type fittings.
- Prior to being charged with refrigerant, the system shall be evacuated to 500 microns and held for at least 24 hours under this vacuum.
- Double-suction risers shall be employed on systems with capacity reduction and where required by lift.
- Precharged lines are not acceptable.
- Isolation valves shall be provided at all specialties.
- Installations shall be complete with dryers, sight glass, and thermostatically-controlled solenoid valves for pump down operations.
- Where defrost units are required, they shall be operated electrically with adequate space provided to replace defrost elements. Defrost shall not be limited to electrical units. In larger installations, hot gas defrost is preferred.

- Installations shall be provided with necessary protective devices including, but not limited to, electric overload devices, low-suction pressure cutouts (manual reset), high head pressure cutouts (manual reset), low-lube oil pressure cutouts (manual reset), oil traps, crankcase heaters, and antirecycling.
- Condensing systems shall be designed for low ambient conditions, using variable-frequency fans or fan staging when required for 24/7 cooling.
- Condensing systems shall be provided for corrosion resistant when installed at Solano College

Approved Manufacturers:

- Condensing Units.
  - Carrier
  - Trane
- Mini Split Systems
  - Carrier
  - Friedrich
  - Mitsubishi
  - Sanyo
  - Daiken
- Computer Room Units
  - Liebert
  - Stulz
  - APC

Substitutes Allowed:

Approved manufacturer or approved equal.

Associated Design Standards and Specifications

- 23 05 10 – HVAC PIPING
- 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
- 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

DESIGN STANDARD for Packaged Air Conditioning Units

Purpose:

Packaged air conditioning units are an essential element of the mechanical space ventilation, cooling, and heating systems. This design standard has the purpose of creating a consistent application of packaged air conditioning unit requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation, and testing of fans used for ventilation and exhaust service for a complete and operating system

- On campuses where a central chilled water system is available, package A/C units are not preferable due to higher energy consumption and increased maintenance costs.
- Air-cooled packaged air conditioning equipment shall be equipped with low ambient cooling if systems are not provided with economizers or if systems serve a 24/7 load.
- All units shall have a dedicated set of minimum outside air dampers for ventilation requirements. The dampers shall be two-position, and a second set of modulating outside air dampers shall be provided, as required, for economizer operation or tracking with exhaust air.
- Rooftop package air conditioners 5 ton and larger shall be mounted on structural steel channel curbs with curb vibration isolation rails. Smaller units may be mounted on the manufacturer's prefabricated curbs. Units located outdoors at Solano College shall be corrosion proof, including their steel supports.
- Where hot water is not available, a gas-fired heat exchanger shall be used. (An electric heating coil is NOT acceptable.)
- Casings shall be double-walled, with hinged access doors where available as an option.

Approved Manufacturers:

- Light Commercial Package A/C Units
  - Carrier
  - York
  - McQuay
  - Trane
- Commercial Package A/C Units
  - Mammoth
  - Governair
  - Petra
- Mini Split Systems
  - Carrier
  - Friedrich
  - Mitsubishi
  - Sanyo
  - Daiken
- Computer Room Units
  - Liebert
  - Stulz
  - APC

Substitutes Allowed:

Approved manufacturer or approved equal.

Associated Design Standards and Specifications

- 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
- 23 05 48 - VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT
- 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

- 23 05 93 - TESTING, ADJUSTING AND BALANCING
- 23 31 00 – DUCTWORK
- 23 62 00 - REFRIGERATION

DESIGN STANDARD for Air Handling Units

Purpose:

Air handling units are an essential element of the mechanical space ventilation, cooling, and heating systems. This design standard has the purpose of creating a consistent application of air handling unit requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation and testing of central station air handling unit for a complete and operating system

- All air handling units shall have, at minimum, a dedicated set of two-position outside air dampers for ventilation requirements plus a second set of modulating outside air dampers, as required, for economizer operation or tracking with exhaust air.
- A full coil section width casing with access door shall be used to separate the chilled and heating coils.
- Coils shall be copper coils with aluminum fins except at Solano College where all coils shall be copper coils with copper fins due to the harsh environment.
- Insulated casings and plenums shall be specified for all units, including those serving heat and vent applications. Provide double wall casings at all locations.
- Casings for heat and vent applications shall have space for installation of future cooling coil.
- Units shall be installed to allow removal of all coils and filters. Clearance equal to full-finned width of coil shall be provided to facilitate removal.
- Units shall be mounted on internal vibration isolators and concrete housekeeping pads.
- Units shall have a mixing box and filter box or a combination filter/mixing box properly sized so as not to exceed the filter manufacturer's recommended face velocities. Low leakage dampers (2%) shall be provided for mixing box dampers.
- All cooling coil drain pans shall be stainless steel.
- Variable speed drives shall be installed on the air handlers in a separate conditioned vestibule.

Approved Manufacturers:

- Light Commercial Air Handlers
  - Carrier
  - York
  - McQuay
  - Trane
- Custom Units
  - Temtrol
  - Energy Labs
  - Governair
  - Haakon
  - Hunt Air
  - Alliance

Substitutes Allowed:

Approved manufacturer or approved equal.

Associated Design Standards and Specifications

- 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
- 23 05 48 - VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT
- 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
- 23 05 93 - TESTING, ADJUSTING AND BALANCING
- 23 31 00 – DUCTWORK

DESIGN STANDARD for Water to Air Heat Pumps

Purpose:

Water to air heat pumps are an essential element of the mechanical space ventilation, cooling, and heating systems. This design standard has the purpose of creating a consistent application of water to air heat pump requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation and testing of water to air heat pump units for a complete and operating system

- Water source and geothermal heat pumps shall be provided with ECM motors and two stage compressors (where available by size).
- Consider utilizing free cooling economizer coil system.
- Horizontal/vertical water source heat pump: Each unit ARI rated, ETL and CSA listed as a horizontal/vertical water source heat pump. Each unit fully tested at the factory. Each unit to include the refrigeration system, fan assembly, motor, DDC controls with interface to campus wide controls system.
- Console water source heat pump: Furnish and install water source heat pump units. Each unit ARI rated and ETL and CSA listed. The unit to consist of a subbase/backwrap for floor mounting and attachment to the back wall or floor, a cabinet front capable of attachment to the backwrap and a slide-out chassis for mounting on the subbase. The chassis to include the refrigeration system, fan assembly, motor, DDC controls with interface to campus wide controls system.
- Horizontal/vertical geothermal water source heat pump: Each unit ARI rated, ETL and CSA listed as a horizontal/vertical geothermal water source heat pump. Each unit fully tested at the factory. Each unit to include the refrigeration system, fan assembly, motor, DDC controls with interface to campus wide controls system

Approved Manufacturers:

- Water Source Heat Pumps
  - Carrier
  - Climate Master
  - Florida Heat Pump
  - Trane
  - McQuay
- Geothermal Water Source Heat Pumps
  - Climate Master
  - Florida Heat Pump
  - Waterfurnace

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications

- 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
- 23 05 48 - VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT
- 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
- 23 05 93 - TESTING, ADJUSTING AND BALANCING
- 23 31 00 - DUCTWORK
- 23 62 00 - REFRIGERATION

DESIGN STANDARD for Hydronic Floor Heating and Cooling System

Purpose:

Hydronic floor heating and cooling systems are an essential element of the mechanical cooling and heating systems. This design standard has the purpose of creating a consistent application of hydronic floor heating and cooling requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Work Included: Materials, installation and testing of hydronic floor heating and cooling systems for a complete and operating system

- Design system to assure there will not be any condensation during cooling mode (if cooling is used).
- Tubing: Flexible single pipe energy transfer hose which is oil resistant and is not degradable by continuous exposure to sunlight. System/tubing shall have an oxygen diffusion barrier. System capable of withstanding temperatures of minus 50F and plus 200F, and provide a commercial warranty of 20 years. Tubing capable of 180 degree change of direction without cracking or collapsing. Burst pressure not less than 800 PSI at 70F installation to meet requirements of manufacturer. Tubing installation and layout as directed and required by manufacturer. Lay out system with separate zones and controls.
- Supply and return manifold piping to energy transfer tubing to be Type "K" copper with brass fittings for transition to tubing
- During the installation, cap tubing on each end to prevent foreign materials from entering the tubing. Check tubing for abrasions prior to installation. Install tubing embedded in the floor without joints or splices, the cold bending radius of the tubing in accordance with Paragraph X2.3.6 of ASTM F877. Install tubing in such a manner as to effectively address the heat loss of the space. Do not place tubing near heat sensitive materials. The manifold and fittings accessible for maintenance. After the system is filled with water/glycol mix, vent air vented from the system. After the system is allowed to stabilize at the operating temperature of the heating fluid, vent the system again. Properly pressure test PEX system in accordance with the tubing manufacturer's guidelines, prior to burial below grade or in concrete. The tubing shall maintain a pressure test of 100 psi for a period of 24 hours prior to such covering. Keep tubing under constant pressure during installation of covering or backfill

- Concrete Slab Construction: Fasten tubing to a flat mesh or reinforcing bar (or other manufacturer-approved device) in accordance with the tubing manufacturers design recommendations.
- Apply test pressure of 125 PSI and maintain for one hour with no visible leaks and no appreciable drop after the test pump has been disconnected

Approved Manufacturers:

- Heatway
- Uponor HE PEX

Substitutes Allowed:

Approved manufacturer or approved equal.

Associated Design Standards and Specifications

- 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
- 23 05 48 - VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT
- 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
- 23 05 93 - TESTING, ADJUSTING AND BALANCING

Electrical Standards

DESIGN STANDARD for Basic Electrical Systems Design

Purpose:

This design standard has the purpose of maintaining a consistent application of the basic electrical requirements of the electrical systems throughout the Solano Community College District therefore achieving a standard of quality for maintenance, reliability, and operation throughout all renovation and new building projects.

Design Standard:

Electrical systems required for this work includes labor, materials, equipment, and services necessary to complete installation of electrical work specified herein or required for a complete operable facility and not specifically described in other Sections of these Standards.

- Following is a list of abbreviations generally used in Division 26:

ADA	Americans With Disabilities Act
AHJ	Authority Having Jurisdiction
ANSI	American National Standards Institute
APWA	American Public Works Association
ASTM	American Society for Testing and Materials
CBC	California Building Code
CEC	California Electrical Code
CFC	California Fire Code
FCC	Federal Communications Commission
HVAC	Heating, Ventilating and Air Conditioning
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers.
IETA	International Electrical Testing Association
FM	FM Global
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
UL	Underwriters Laboratories Inc.

- Conform to requirements of the CEC, latest adopted version with amendments by local AHJs.
- Conform to latest adopted version of the CBC with amendments by local AHJs.
- Obtain and pay for electrical permits, plan review, and inspections from local AHJs.
- Furnish products listed by UL or other testing firm acceptable to AHJ.
- Conform to requirements of the serving electric, telephone, and cable television utilities.
- Provide like items from one manufacturer, such as luminaire types, switches, receptacles, breakers, panels, and the like.

All materials to meet the following requirements based on Code requirements and industry standard of design and care:

- Provide new electrical materials of the type and quality, listed by UL, bearing their label wherever standards have been established. Indicated brand names and catalog numbers are used to establish standards of performance and quality. The description of materials listed herein governs in the event that catalog numbers do not correspond to materials described herein.
- Provide material and equipment that is acceptable to AHJ as suitable for the use. For example, provide wet labeled equipment in locations that are wet.
- Provide incidentals not specifically mentioned herein, but needed to complete the system, in a safe and satisfactory working condition.

All documents to meet the following requirements based on District requirements and industry standard of design and care:

- Prepare and submit layout drawings to coordinate installation and location of lighting, electrical and signal systems. Prepare composite drawings showing all equipment on a single sheet. The

architectural floor plans, reflected ceiling plans, and access floor layout plan shall form the base for the coordination drawings. Prior to completion of Drawings, coordinate proposed installation with the Architect, structural requirements, and other trades (including HVAC, plumbing, fire protection, ceiling systems, and raised floor system), and provide required maintenance access. Systems shall include, although not limited to, the following:

- Luminaires.
- Occupancy sensors.
- Wiring devices.
- Electrical equipment enclosures.
- Control equipment enclosures.
- Route of feeders 100A and larger.
- Route of cable tray systems.
- Surface metal raceways.
- Conduit rack supports.
- Transformers and supports.
- Standby engine generator.
- Fire alarm devices, annunciators and control panel.
- Outlet boxes and raceway system for security system alarm devices and control panel.
- Outlet boxes and raceway system for telephone, data and CATV raceways 2 inches and larger.

- Prepare Drawings as follows:
  - Prepare Drawings, to accurate scale, in latest AutoCAD graphics format printed to media as directed by District.
  - Distribute plans to all trades and provide additional coordination as needed.
- Advise Architect, in event a conflict occurs in location of equipment. Bear all costs for relocation of equipment, resulting from failure to properly coordinate installation or failure to advise Architect of conflict.
- Provide means of access to all junction and pull boxes and concealed equipment which may require access, adjustment or servicing.
- Final coordination drawings, with as-constructed information added, are to be submitted as record drawings at completion of project. Plans are to incorporate all addenda items and change orders.

All installation methods to meet the following requirements based on district requirements and industry standard of design and care:

- Install electrical equipment complete as directed by manufacturer's installation instructions. Obtain installation instructions from manufacturer prior to rough-in of the electrical equipment, examine the instructions thoroughly. When requirements of the installation instructions conflict with the Contract Documents, request clarification from Architect prior to proceeding with the installation.
- Do not install electrical equipment in obvious passages, doorways, scuttles or crawl spaces which would impede or block the area passage's intended usage.
- Earthwork:
  - Refer to Division 31, Section "Earthwork."
  - Perform excavation and backfill required for the installation of electrical work.
- Noise Control:
  - Do not install outlet boxes back to back. Do not use straight through boxes.
  - Do not place contactors, transformers, starters and similar noise producing devices on walls which are common to occupied spaces unless specifically directed by the District. Where such devices must be mounted on walls common to occupied spaces, mount or isolate in such a manner as to effectively prevent the transmission of their inherent noise to the occupied space.
- Firestopping:
  - Coordinate with the Drawings the location of fire rated walls, ceilings, floors and the like. When these assemblies are penetrated by electrical equipment, seal around the equipment with approved firestopping material.
  - Install firestopping material complete as directed per the manufacturer's installation instructions.

All field quality control methods to meet the following requirements based on Code requirements and industry standard of design and care:

- Tests:
  - Conduct tests of equipment and systems to demonstrate compliance with requirements specified in Division 26. Refer to individual Specification Sections for required tests. Document tests and include in Closeout Documents.
  - During site evaluations by the Inspector of Record (IOR), provide an electrician with tools to remove and replace trims, covers, devices, and the like, so that a proper evaluation of the installation can be performed.
- Testing shall include:
  - Daylight automatic controls.
  - Occupant sensing automatic controls.
  - Automatic time and override controls for interior lighting.
  - Automatic time and photo controls for exterior lighting.
  - Lighting system control testing and commissioning:
    - Test lighting controls to ensure that control devices, components, equipment and systems are calibrated, adjusted and operate in accordance with Drawings and Specifications. Provide functional testing of sequences of operation to ensure operation in accordance with Drawings and Specifications. Provide complete report of test procedures and results to engineer and insert approved copy into project closeout documents.

All cleaning methods to meet the following requirements based on district requirements and industry standard of design and care:

- Remove dirt and debris caused by the execution of the electrical work.
- Leave the entire electrical system installed under this Contract in clean, dust-free and proper working order.
- Vacuum clean interiors of all new and modified electrical signal and communication equipment enclosures.

For renovations requiring demolition, all demolition methods to meet the following requirements based on district requirements and industry standard of design and care:

- Coordinate with District so that work can be scheduled not to interrupt operations, normal activities, building access, access to different areas. The District will cooperate to the best of their ability to assist in a coordinated schedule, but will remain the final authority as to time of work permitted.
- Examination: Determine the exact location of existing utilities and equipment before commencing work, compensate the District for damages caused by the failure to locate and preserve utilities. Replace damaged items with new material to match existing.
- Promptly notify District if utilities are found which are not shown on record Drawings.
- Execution:
  - Remove existing luminaires, switches, receptacles, and other electrical equipment and devices and associated wiring from walls, ceilings, floors, and other surfaces scheduled for remodeling, relocation, or demolition.
  - Maintain electrical continuity of existing systems. Remove or relocate electrical boxes, conduit, wiring, equipment, luminaires, and the like, as encountered in removed or remodeled areas in the existing construction affected by this work.
  - Remove and restore wiring which serves usable existing outlets clear of the construction or demolition
  - If existing junction boxes will be made inaccessible, or if abandoned outlets serve as feed through boxes for other existing electrical equipment which is being retained, provide new conduit and wire to bypass the abandoned outlets.
  - If existing conduits pass through partitions or ceiling which are being removed or remodeled, provide new conduit and wire to reroute clear of the construction or demolition and maintain service to the existing load.
  - Extend circuiting and devices in existing walls to be furred out.
  - Remove abandoned wiring to leave site clean.
  - If existing lighting which is to remain or be relocated is to be relamped, reballasted and cleaned, notify architect and/or District. Leave all luminaires in proper working order.
  - If existing electrical equipment contains PCBs (polychlorinated biphenyl), replace with new. Dispose of material containing PCBs as required by federal and local regulations.
  - Repair adjacent construction and finishes damaged during demolition work.

- Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.

For renovations requiring demolition, all methods for salvaged equipment and recycled material shall meet the following requirements based on District requirements and industry standard of design and care:

- Salvage the following equipment not being reused and return to District (as applicable):
  - Luminaires
  - Panelboards
  - Breakers
  - Transformers
- Salvage the following equipment not being reused and sell/give to electrical salvage company (as applicable):
  - Luminaires
  - Panelboards
  - Breakers
  - Transformers
- Electrical equipment that cannot be salvaged for reuse, sell/give to recycling company. Recycle the following excess, removed, or demolished electrical material (as applicable):
  - Copper or aluminum conductors, buses, motor/transformer windings, and the like.
  - Steel and aluminum from raceways, boxes, enclosures, housings and the like.
  - Acrylic and glass from luminaire lenses/refractors.
- Provide separate on-site storage space for recycled and salvaged material. Clearly label space for intended use.

For renovations requiring demolition, all systems requiring continuity of service shall meet the following requirements based on District requirements and industry standard of design and care:

- No interruption of services to any part of existing facilities will be permitted without express permission in each instance from the District. Requests for outages shall state the specific dates and hours and the maximum durations, with the outages kept to these specific dates and hours and the maximum durations. Obtain written permission from the District for any interruption of power, lighting or signal circuits and systems.
- If overtime is necessary, there will be no allowance made by District for extra expense for such overtime or shift work, due to maintaining continuity of service herein required.
- Organize work to minimize duration of power interruption.

Operation and Maintenance Documentation: Provide copies of certificates of code authority acceptance, test data, product data, guarantees, warranties, and the like.

Closeout Documentation: Submit electrical code authority certification of inspection. Include documentation of on-site electrical testing that was performed.

Sustainable Design Practices

- The Solano Community College District has a desire to build buildings utilizing sustainable design techniques. As part of the Electrical Design Standards, sample sustainable design opportunities are provided in a table in the Sustainability Section of the Solano Community College District standards. Each strategy needs to be integrated appropriately into their respective projects. Development of design strategies for each item is beyond the scope of this Design Standard and requires careful consideration for proper application. The District will select on a case by case basis, which projects will be LEED™ Certified and to what level.

Approved Manufacturers:

Refer to individual standards.

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications:

- Division 22 Plumbing
- Division 23 Heating Ventilation and Air Conditioning
- Division 27 Communications

DESIGN STANDARD for Medium Voltage Cables

Purpose:

This design standard has the purpose of creating a consistent application of medium voltage cables throughout the Solano Community College District therefore achieving a standard of maintenance, reliability and quality throughout all renovation and new building projects.

Design Standard:

Provide installation of medium voltage cable, terminations, and splicing, as required by code and detailed in the Contract Documents.

Medium voltage cables include the following but not limited to:

- Cables.
- Terminations.

All medium voltage cables to meet the following requirements based on Code requirements and industry standard of care:

- Regulatory Requirements:
  - UL 1072.
  - NEMA-WC7.
  - ICEA Standards S-68-516 and CS6-79.

All cables to meet the following requirements based on code requirements and industry standard of care:

- Type MV-90, 133 percent insulation, single uncoated annealed copper conductor with Class B stranding, with strippable extruded conductor shielding around the conductors.
- Conductor screen consists of an extruded layer of semiconducting compound with a volume resistivity not exceeding 50,000 ohms-cm at 90C and a minimum average thickness of 22 mils.
- Provide flexible thermosetting dielectric based insulation on an ethylene-propylene elastomer (APPEAR).
- Provide insulation screen with an extruded semi-conduction compound with a volume resistivity not exceeding 50,000 ohms-cm at 90C.
- Provide extruded insulation screen shielded with a nonmagnetic 5 mil thick copper tape.
- The overall jacket is polyvinyl chloride, 80 mils thick.
- Cable has continuous factory printed identification on the outer jacket for the full length of the cable indicating manufacture's name, trade name of cable, voltage, wire size, and type of insulation. Deliver cables to the site on factory reels properly identified with the certified test report and marked or tagged to indicate the month and year of manufacturer of the cable. Provide cable from the same manufacturer.

All terminations and splices to meet the following requirements based on code requirements and industry standard of care:

- Provide terminations in weatherproof enclosures with preformed stress cones rated for the system voltage, phase-to-phase with a corona extinction level for the system voltage. Use a stress cone designed specifically to terminate the cable on which it is used, and which provides a watertight seal to the cable insulation. Incorporate a grounding eye, eliminating the need for a metal ground clamp to the cable shield.
- Provide terminations exposed to the weather with a preformed stress cone, as described in preceding paragraph, with the appropriate number of rain shields required for the system voltage.
- Protect terminations of insulated cables from accidental contact, deterioration of covering, and moisture by the use of terminating devices and material. Install terminations in accordance with the kit and cable manufacturer's instructions.
- Provide splicing and terminating materials compatible with the cable supplied. Submit proof of acceptability by cable manufacturer of splicing and terminating materials.
- When installing medium voltage cables:
  - Protect conductors from mechanical and physical abuse, and from exposure to the atmospheric elements. Do not bend cable to less than 12 times the outer diameter of the cable.
  - Provide terminations and splices performed by skilled high voltage personnel. Submit record of experience for personnel performing splices and terminations. Provide the services of a field engineer of the cable manufacturer to supervise and certify terminations and splices.
  - Install cables in conduit.

- For quality control of medium voltage cables:
  - Provide field insulation tests on conductors as recommended by ANSI/IEEE 141. Test under DC voltage conditions recommended by cable manufacturer warranty constraints.
  - Provide tests performed by a testing agency with 5 years documentable experience testing medium and high voltage cables.
  - Complete tests with terminal equipment disconnected.
  - Provide written final report and test results to the District.

Approved Manufacturers:

- Cable:
  - General Electric
  - General Cable
  - Rome
  - Okonite
- Terminations and Splices:
  - 3M
  - Elastimold
  - Cable Manufacturer

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications:

- 26 00 00 - Basic Electrical Requirements

DESIGN STANDARD for Wires, Cables and Connectors

Purpose:

Provide wires, cables, connectors, lugs, and the like for a complete and operational electrical system. This design standard has the purpose of creating a consistent application for the installation of wires, cables, and connectors throughout the Solano Community College District therefore achieving a standard of quality for maintenance, reliability, and operation throughout all renovation and new building projects.

Design Standard:

- Wiring shall be copper, 600 volt rated throughout.
  - Conductors #10 and smaller shall be solid,
  - #8 and larger shall be stranded, 90°c rated.
  - Conductors 3 AWG and larger, minimum insulation rating of 75C.
  - Insulation types THWN, THHN or XHHW. Minimum insulation rating of 90C for branch circuits.
- MC Cable:
  - High strength galvanized steel flexible armor.
  - Full length minimum size No. 12 copper ground wire, THHN 90C conductors, full length tape marker. Overall PVC or nylon cable tape.
  - Short circuit throat insulators, mechanical compression termination.
  - MC Cable is allowed for the following conditions. Installations not meeting these conditions will be removed and replaced at installer's own expense.
    - 20 and 30 amp branch circuiting where following conditions apply:
      - Where there is a suspended ceiling with accessible space above (example: suspended acoustic ceiling tile).
      - Do not use for homeruns from branch circuit to first device or luminaire in circuit.

- For drops to ceiling-mounted luminaires in areas with accessible ceiling space.

- The electrical design engineer must provide for the possible effects of harmonics on the neutral wire and the transformer.
- Phase color to be consistent at feeder terminations; A-B-C, top to bottom, left to right, front to back.
- Color Code Conductors as Follows:

PHASE	208 VOLT WYE	240 VOLT DELTA	480 VOLT
A	Black	Black	Brown
B	Red	Orange (High Leg)	Orange
C	Blue	Blue	Yellow
Neutral	White	White	Or White w/ colored strip
Ground	Green	Green	Green
Isolated Ground	Green w/yellow trace	N/A	N/A

- Connectors types shall have the following characteristics:
  - Copper Pads: Drilled and tapped for multiple conductor terminals.
  - Lugs: Indent/compression type for use with stranded branch circuit or control conductors. Manufacturers: Anderson, Ilsco, Panduit, Thomas & Betts, 3M, or approved.
  - Conductor Branch Circuits: Wire nuts with integral spring connectors for conductors 18 through 8AWG. Push-in type connectors where conductors are not required to be twisted together are not acceptable. Manufacturers: 3M, Ideal, or approved.
- Conductor Installation:
  - Install conductors in raceways having adequate, code size cross-sectional area for wires indicated.
  - Install conductors with care to avoid damage to insulation.
  - Do not apply greater tension on conductors than recommended by manufacturer during installation.
  - Use of pulling compounds is permitted. Clean residue from exposed conductors and raceway entrances after conductor installation. Do not use pulling compounds for installation of conductors connected to GFCI circuit breakers or GFCI receptacles.
- Conductor Size and Quantity:
  - Install no conductors smaller than 12AWG.
  - Provide required conductors for a fully operable system.
- Provide dedicated neutrals (one neutral conductor for each phase conductor).
- Provide dedicated circuits for refrigerators, microwaves, copiers, large printers, portable heaters, and the like.
- Provide a dedicated computer circuit for every three offices.
- Provide a dedicated convenience circuit for every four offices.
- Conductors in Cabinets:
  - Cable and tree wires in panels and cabinets for power and control. Use plastic ties in panels and cabinets.
  - Tie and bundle feeder conductors in wireways of panelboards.
  - Hold conductors away from sharp metal edges.
- Test conductor insulation on feeders of 100 amps and greater for conformity with 1000 volt megohmmeter. Use Insulated Cable Engineers Association testing procedures. Minimum insulation resistance acceptable is 1 megohm for systems 600 volts and below. Notify District if insulation resistance is less than 1 megohm.

Approved Manufacturers:

- General Cable
- Southwire
- Carol

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications:

- 26 05 26 - GROUNDING
- 26 05 33 – RACEWAYS
- 26 05 48 – SUPPORTING DEVICES
- 26 05 53 – IDENTIFICATION

DESIGN STANDARD for Grounding

Purpose:

Provide grounding and bonding of electrical service, circuits, equipment, signal and communications systems. This design standard has the purpose of creating a consistent application of the electrical system requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, reliability, and operation throughout all renovation and new building projects.

Design Standard:

Install equipment grounding such that metallic structures, enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, portable equipment and other conductive items in close proximity with electrical circuits operate continuously at ground potential and provide a low impedance path for possible ground fault currents. Grounding Electrode Conductor shall be a bare copper stranded conductor.

Supplement the grounded neutral of the secondary distribution system with an equipment grounding system to properly safeguard the equipment and personnel.

The grounding system shall meet the following installation requirements based on Code requirements and standard industry practices:

- Concrete Encased Ground Electrode (“Ufer ground”):
  - From the service equipment ground bus install grounding electrode conductor to footing/foundation rebar.
  - Bond the grounding electrode conductor to independent steel rebars.
  - Protect grounding electrode conductor extension from footing/foundation to service equipment with rigid PVC conduit. Do not use metal conduit for grounding electrode conductor protection.
- Ground Rod Electrode:
  - Coordinate placement of ground rods and interconnecting conductor in base of building concrete footing prior to placement of concrete.

- Install stranded bare copper conductor in base of perimeter concrete footing, minimum gauge: #3/0.
- Layout conductor to provide maximum exposure to earth in the perimeter footing. Do not fold conductor.
- Bond to driven ground rods.
- Tap at center ground rod and extend ground electrode conductor to service ground bus. Install grounding electrode conductor extension in rigid PVC conduit for physical protection. Do not use metal conduit for grounding electrode conductor protection.

- Water Service Grounding: Bond building ground electrode and water service pipe to service ground bus. Connect to water pipe on utility side of isolating fittings or meters, bond across water meters.
- Other Piping Systems: Bond gas piping system, fire sprinkler piping system and other metal piping systems to service equipment ground bus.
- Raceways:
  - Ground metallic raceway systems. Bond to ground terminal with code size jumper except where code size or larger grounding conductor is included with circuit, use grounding bushing with lay-in lug.
  - Connect metal raceways, which terminate within an enclosure but without mechanical connection to the enclosure, by grounding bushings and ground wire to the grounding bus.
  - Where equipment supply conductors are in flexible metallic conduit, install stranded copper equipment grounding conductor from outlet box to equipment frame.
  - Install equipment grounding conductor, code size minimum in raceway systems.
- Feeders and Branch Conduits:
  - Install continuous insulated equipment copper ground conductors within the following circuits; feeders, circuits for computer systems and other circuits as required.
  - Where installed in a continuous solid metallic raceway system and larger sizes are not detailed, provide insulated equipment ground conductors for feeders and branch circuits sized in accordance with Table 250-122.
  - Install isolated ground conductors for electrically sensitive equipment. Install isolated grounding conductors isolated from the equipment ground system except at the common ground connection at the service equipment. Provide isolated ground bus in panelboards isolated from the equipment ground system.
- Boxes, Cabinets, Enclosures and Panelboards:
  - Bond grounding conductors to enclosure with specified conductors and lugs. Install lugs only on thoroughly cleaned contact surfaces.
  - Bond sections of service equipment enclosure to service ground bus.
- Motors, Equipment and Appliances: Install code size equipment grounding conductor from outlet box to (motor) equipment frame or manufacturer's designated ground terminal.
- Receptacles: Connect ground terminal of receptacle to equipment ground system by No. 12 conductor bolted to outlet box except isolated grounds where noted. Self grounding nature of receptacle devices does not eliminate conductor bolted to outlet box.
- Telecommunications Grounding System: Mount telecommunications main grounding busbar (TMGB) in each MDF. Mount a telecommunications grounding busbar (TGB) in each IDF. Install main telecommunications bonding backbone (TBB) conductor continuous from the MDF to every IDF. Bond the TMGB to the main building electrical grounding system and the nearest acceptable structural ground with a 3/0 AWG copper equipment grounding conductor.
- Separately Derived Systems: Ground each separately derived system.

Approved Manufacturers:

- Ground Rods
  - Weaver
  - Thomas & Betts
  - Talley
- Grounding Connectors
  - Burndy Hyground Compression Systems
  - Erico/Cadweld
  - Amp Ampact Grounding System

- Pipe Grounding Clamps
  - Burndy GAR Series
  - O-Z Gedney
  - Thomas & Betts
- Telecommunication Grounding Bus Bar
  - Chatsworth
  - Erico
  - Square D
  - Panduit

Substitutes Allowed:

Upon review and approval.

Associated Design Standards and Specifications:

- 26 24 00 - Switchboards and Distribution Panelboards
- 26 05 34 - Boxes

DESIGN STANDARD for Raceways

Purpose:

Provide raceways, wires, cables, connector, boxes, devices, finish plates and the like for a complete and operational electrical system. This design standard has the purpose of creating a consistent application for the installation of raceways throughout the Solano Community College District therefore achieving a standard of quality for maintenance, reliability, and operation throughout all renovation and new building projects.

Design Standard:

- Sequencing and Scheduling: Raceway System is Defined as Consisting of: Conduit, tubing or duct and fittings including but not limited to connectors, couplings, offsets, elbows, bushings, expansion and deflection fittings and other components and accessories. Complete electrical raceway installation before starting the installation of conductors and cables.
- Conduits:
  - Galvanized Rigid Steel Conduit (GRC):
    - Hot-dip galvanized after thread cutting.
    - Manufacture in conformance with Federal Specification WWC-581 and ANSI C80.1.
    - Uniform finish coat with chromate for added protection.
  - Rigid Aluminum Conduit: Alloy 6063, threaded at each connection.
  - Intermediate Metal Conduit (IMC):
    - Hot-dip galvanized after thread cutting.
    - Manufacture in conformance with Federal Specification WWC-581.
    - Uniform finish coat with chromate for added protection.
  - Electrical Metallic Tubing (EMT):
    - Hot-dip galvanized and chromate coated.

- Manufacture in conformance with Federal Specification WWC-563 and ANSI C80.3.

- Flexible Conduit:
  - Reduced wall flexible steel conduit.
  - Hot-dip galvanize steel strip prior to forming and joining.
  - Manufacture in conformance with Federal Specification WWC-566.
- Flexible Conduit, PVC Coated:
  - Hot-dip galvanize steel strip prior to forming and joining.
  - PVC chemical resistant jacket extruded to core, up to 1 inch trade size.
  - PVC chemical resistant jacket, tubed over core, up to 4 inch trade size.
- PVC:
  - Class 40 heavy wall rigid PVC.
  - Rated for use with 90C conductors.
  - Manufacture in conformance with Federal Specification WC1094A and NEMA TC-2.

- Conduit Fittings:
  - Bushings:
    - Insulated Type for Threaded Rigid, IMC Conduit or Raceway Connectors without Factory Installed Plastic Throat Conductor Protection: Thomas & Betts 1222 Series or O-Z Gedney B Series.
    - Insulated Grounding Type for Threaded Rigid, IMC Conduit and Conduit Connectors: O-Z Gedney BLG Series.
  - Raceway Connectors and EMT Couplings:
    - Steel conductor and coupling bodies, with zinc electroplate or hot-dip galvanizing.
    - Connector locknuts are steel, with threading meeting ASTM tolerances. Locknuts are zinc electroplated or hot-dip galvanized.
    - Connector throats (EMT, flexible conduit, metal clad cable and cordset connectors) have factory installed plastic inserts permanently installed. For normal cable or conductor exiting angles from the raceway, the cable jacket or conductor insulation bears only on the plastic throat insert.
    - Steel gland, Tomic or Breagle connectors and couplings are recognized for this Contract as having acceptable raceway to fitting electrical conductance.
    - Set screw connectors and couplings, without integral compression glands, are recognized for this Contract as not having acceptable raceway to fitting electrical conductance. A ground conductor sized per this Specification must be included and bonded within a raceway assembly utilizing this type connector or coupling.
  - Expansion/Deflection Fittings:
    - EMT, O-Z Gedney Type TX.
    - RMC, O-Z Gedney Type AX, DX and AXDX, Crouse & Hinds XD.
- Conduit Joints: Assemble conduits continuous and secure to boxes, panels, luminaires and equipment with fittings to maintain continuity. Provide watertight joints where embedded in concrete, below grade or in damp locations. Seal PVC conduit joints with solvent cement and metal conduit with metal thread primer. Rigid conduit connections to be threaded, clean and tight (metal to metal). Threadless connections are not permitted for GRC and IMC.
- Conduit Placement:
  - Install continuous conduit and raceways for electrical power wiring and signal systems wiring.
  - Conceal conduits. Exposed conduits are permitted only in the following areas:
    - Mechanical rooms, electrical rooms or spaces where walls, ceilings and floors will not be covered with finished materials.
    - Existing walls that are concrete or block construction.
    - Where exposed conduits are permitted install parallel or at right angles to building lines, tight to finished surfaces and neatly offset into boxes.
  - Do not install conduits or other electrical equipment in obvious passages, doorways, scuttles or crawl spaces which would impede or block the area passage's intended usage.

  - Do not install conduits on surface of building exterior, across roof, on top of parapet walls, or across floors.
  - Route raceway at least 6 inches from hot surfaces above 120F, including noninsulated steam lines, heat ducts, and the like.
- Below Grade Conduit and Cables:
  - Place a minimum 3 inch cover of sand or clean earth fill around the cable or conduit on a leveled trench bottom. Lay conduit on a smooth level trench bottom, so that contact is made for its entire length.
  - Remove water from trench before electrical conduit is installed.
  - When three or more conduits are in a single trench, use conduit spacers that will maintain 3 inch spacing between the conduits. Provide spacers on 5 foot centers.
- Maximum Bends: Install code sized pull boxes to restrict maximum bends in a run of conduit to 270 degrees.
- Conduit Terminations: Provide conduits shown on Drawings which terminate without box, panel, cabinet or conduit fitting with not less than five full threads. Bushings and metal washer type sealer between bushing and conduit end.
- Flexible Conduit: Install 12 inch minimum slack loop on flexible metallic conduit and PVC coated flexible metallic conduit.
- Conduit Size: Provide conduit in minimum code permitted size for THW conductors of quantity shown. Minimum trade size 1/2 inch.
- Conduit Use Locations:
  - Underground: PVC.
  - Wet Locations, Classified Locations, and Subject to Mechanical Damage: GRC, IMC.
  - Damp Locations and Locations Exposed to Rain: GRC, IMC, and EMT up to 2 inches in diameter.
  - Cast-In-Place Concrete and Masonry: GRC, IMC, and PVC. Horizontal runs of conduit in poured-in-place concrete slabs.
  - Dry, Protected: GRC, IMC, EMT.
  - Sharp Bends and Elbows: GRC, EMT use factory elbows.
- Install pull wire or nylon cord in empty raceways provided for other systems. Secure wire or cord at each end.
- Elbow for Low Energy Signal Systems: Use long radius factory ells where linking sections of raceway for installation of signal cable.
- Motors, recessed luminaires and equipment connections subject to movement or vibration, use flexible metallic conduit.
- Motors and equipment connections subject to movement or vibration and subjected to any of the following conditions; exterior location, moist or humid atmosphere, water spray, oil or grease use PVC coated liquid tight flexible metallic conduit.
- Branch Circuits: Do not change the intent of the branch circuit or controls without approval. Homeruns for 20 amp branch circuits may be combined to a maximum of six conductors in a homerun. Apply derating factors. Increase conductor size as needed.
- Feeders: Do not combine or change feeder runs.
- Unless otherwise indicated, provide raceway systems for lighting, power and Class 1 remote-control and signaling circuits and Class 2 and 3 remote-control signaling and communication circuits.
- Conduit Fittings:
  - Use set screw type fittings only in dry locations. When set screw fittings are utilized provide insulated continuous equipment ground conductor in conduit, from over current protection device to outlet.
  - Use compression fittings in dry locations, damp and rain-exposed locations. Maximum size permitted in damp locations and locations exposed to rain is 2 inches in diameter.
  - Use threaded type fittings in wet locations, hazardous locations, and damp or rain-exposed locations where conduit size is greater than 2 inches.
  - Use PVC coated rigid steel conduit ells for underground power and telephone service entrance conduits. Use 36-inch radius ells for power service conduits and 48-inch radius ells for telephone service conduits.
  - Use insulated type bushings with ground provision at switchboards, panelboards, safety disconnect switches, junction boxes and the like that have feeders 60 amperes and greater.
  - Provide bushing or EMT connector for conduits that do not terminate in box, enclosure, or the like.

- Provide conduit expansion fittings at building expansion joints and at locations where conduit is exposed to thermal expansion and contraction.
- Condulets and Conduit Bodies: Do not use condulets and conduit bodies in conduits for signal wiring and in feeders 100 amp and larger.

- Sleeves and Chases - Floor, Ceiling and Wall Penetrations: Provide necessary rigid conduit sleeves, openings and chases where conduits or cables are required to pass through floors, ceiling or walls.
- Conduit crossing building seismic joints:
  - Provide box on either side of joint and flexible conduit between the box.
  - Coordinate with structural engineer and/or architect to determine movement at the seismic joint.
  - Rigid conduit crossings at seismic joints are not acceptable.

Approved Manufacturers:

- Allied Steel
- Certainteed
- Jones & Laughlin
- Carlon
- Kraloy

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications:

- 26 05 26 – GROUNDING
- 26 05 34 – BOXES

DESIGN STANDARD for Boxes

Purpose:

This design standard has the purpose of creating a consistent application for the installation of electrical boxes throughout the Solano Community College District therefore achieving a standard of quality for maintenance, reliability, and operation throughout all renovation and new building projects.

Design Standard:

Provide electrical boxes and fittings for a complete installation. Include but not limited to outlet boxes, junction boxes, pull boxes, bushings, locknuts, and other necessary components.

- Locate boxes and conduit bodies so as to ensure accessibility of electrical wiring.
- Avoid using round boxes where conduit must enter through side of box, which would result in a difficult and insecure connection with a locknut or bushing on the rounded surface.
- Secure boxes rigidly to the substrate upon which they are being mounted, or solidly embed boxes in concrete or masonry.
- Provide weatherproof outlets for locations exposed to weather or moisture.
- Provide knockout closures to cap unused knockout holes where blanks have been removed.
- Mount center of outlet boxes, unless otherwise required by ADA, the following distances above the floor:
  - Control Switches: 46 inches.
  - Receptacles: 18 inches.
  - Telecom Outlets: 18 inches.
  - Other Outlets: As indicated in other sections of specifications or as detailed on drawings.
- Coordinate electrical device locations (switches, receptacles, and the like) with architectural elevations to prevent mounting devices in mirrors, back splashes, behind cabinets, and the like.

All outlet boxes to meet the following requirements based on Code requirements and industry standard of care:

- Luminaire Outlet: 4-inch octagonal box, 1-1/2 inches deep with 3/8-inch luminaire stud if required. Provide raised covers on bracket outlets and on ceiling outlets.
- Device Outlet: Installation of one or two devices at common location, minimum 4 inches square, minimum 1-1/2 inches deep. Single- or two-gang flush device raised covers. Hubbell.
- Signal and communications systems outlet: 4-inches square,minimum 2-1/8 inches deep. One- or two- gang raised device cover. Hubbell.
- Multiple Devices: Three or more devices at common location. Install one-piece gang boxes with one-piece device cover. Install one device per gang.
- Masonry Boxes: Outlets in concrete, Hubbell.
- Construction: Provide galvanized steel interior outlet wiring boxes, of the type, shape and size, including depth of box, to suit each respective location and installation; constructed with stamped knockouts in back and sides, and with threaded holes with screws for securing box covers or wiring devices.
- Accessories: Provide outlet box accessories for each installation, including mounting brackets, wallboard hangers, extension rings, luminaire studs, cable clamps and metal straps for supporting outlet boxes, compatible with outlet boxes being used and meeting requirements of individual wiring situations.
- For weatherproof outlet boxes, provide corrosion-resistant cast metal weatherproof outlet wiring boxes, of the type, shape and size, including depth of box, with threaded conduit ends, cast metal face plate with spring-hinged waterproof cap suitably configured for each application, including face plate gasket, blank plugs and corrosionproof fasteners. Weatherproof boxes to be constructed to have smooth sides, gray finish.
- For junction and pull boxes, provide ANSI 49 gray enamel painted sheet steel junction and pull boxes, with screw-on covers; of the type shape and size, to suit each respective location and installation; with welded seams and equipped with steel nuts, bolts, screws and washers.
    - Install junction boxes above accessible ceilings for drops into walls for receptacle outlets from overhead.
    - Install junction boxes and pull boxes to facilitate the installation of conductors and limiting the accumulated angular sum of bends between boxes, cabinets and appliances to 270 degrees.
- Provide diecast aluminum box extension adapters as necessary and install over flush wall outlet boxes to permit flexible raceway extension from flush outlet to fixed or movable equipment. Bell 940 Series, Red Dot IHE4 Series.
- For conduit fittings, provide corrosion-resistant punched-steel box knockout closures, conduit locknuts and plastic conduit bushings of the type and size to suit each respective use and installation.

In general, avoid use of floor boxes. If floor boxes must be used, carpet flooring is preferred. If floor boxes and poke-thrus must be used, meet the following requirements based on Code requirements and industry standard of care (device numbers noted are Wiremold. Provide equivalent as noted under approved manufacturers):

- Multi-Gang Box, Slab on Grade: Wiremold RFB4-CI series cast iron housing with S36CCTC series, steel flanged activation for use with matching carpet or tile insert. Rubber gasket protects interior from water and debris. Provide with two duplex receptacles and blank inserts for two future data outlets.
- Multi-Gang Box, Slab above Grade: Wiremold RFB4 series steel housing with S36CCTC series, steel flanged activation for use with matching carpet or tile insert. Rubber gasket protects interior from water and debris. Provide with two duplex receptacles and blank inserts for two future data outlets.
- Multi-Gang Box, Concrete Finish Floor: Same as above, except use Wiremold S36BBTC series, steel flanged activation.
- Single Gang Box, Slab on Grade: Wiremold 880CM (cast-iron) series with 817 series flange suitable for both carpet and tile floors, and 828GFI cover plate insert.
- Single Gang Box, Slab above Grade: Wiremold 880S (stamped steel) series with 817 series flange suitable for both carpet and tile floors, and 828GFI cover plate insert.
- Poke-Thrus: Fire rated for 4 hour, dual service, flush brass cover and service fitting prewired specification grade receptacle, voice/data jacks, Hubbell PT7 Series, or approved.
- Provide floor boxes sized minimum 3-7 /16 inches deep with 1-inch factory knockouts.
- Brass or Aluminum finish for flanges will be determined per specific installation and as directed by the architect.

Approved Manufacturers:

- Outlet Boxes:
    - Bowers
    - Hubbell

- Weatherproof Outlet Boxes and Box Extension Adapters:
  - Bell
  - Red Dot
  - Carlon
- Junction and Pull Boxes:
  - Circle AW
  - Hoffman
- Conduit Fittings:
  - O-Z Gedney
  - Thomas & Betts, or approved.
- Floor Boxes:
  - Wiremold/Walker
  - Hubbell

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications:

- 26 05 26 – GROUNDING
- 26 05 34 – BOXES

DESIGN STANDARD for Supporting Devices

Purpose:

This design standard has the purpose of creating a consistent application for the installation of supporting devices throughout the Solano Community College District therefore achieving a standard of quality for maintenance, reliability, and operation throughout all renovation and new building projects.

Design Standard:

Supporting devices shall have a safety factor of 4 required for every fastening device or support for electrical equipment installed. Supporting devices are to withstand four times the weight of equipment it supports. Bracing shall comply with Seismic Zone 4 requirements.

- Provide electrical equipment supports.
- Verify mounting height of luminaires or items prior to installation of supporting devices when heights are not detailed.
- Install vertical support members for equipment and luminaires, straight and parallel to building walls.
- Provide independent supports to structural member for electrical luminaires, materials, or equipment installed in or on ceiling, walls or in void spaces or over furred or suspended ceilings.
- Do not use other trade's fastening devices as supporting means for electrical equipment materials or fixtures.
- Do not use supports or fastening devices to support more than one particular item.
- Support conduits within 18 inches of outlets, boxes, panels, cabinets and deflections.
- Maximum distance between supports not to exceed 8 foot spacing.
- Securely suspend junction boxes, pull boxes or other conduit terminating housings located above suspended ceiling from the floor above or roof structure to prevent sagging and swaying.
- Provide seismic bracing per CBC requirements.

Approved Manufacturers:

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications:

- 26 05 34 – BOXES

DESIGN STANDARD for Electrical Identification

Purpose:

This design standard has the purpose of creating a consistent application for the identification of electrical equipment and devices throughout the Solano Community College District therefore achieving a standard of quality throughout all renovation and new building projects.

Design Standard:

All identification material and methods to meet the following requirements based on Code requirements and industry standard of care:

- Coordinate names, abbreviations and other designations with equipment specified in this or other Divisions of the Specification or identified by the District.
- Fasten labels to equipment in a secure and permanent manner.
- Mark underground utilities in conformance with APWA.
- Conform to requirements of the CEC, latest adopted version with amendments by local AHJs.
- Furnish products listed by UL or other testing firm acceptable to AHJ.
- Where signs are to be applied to surfaces which require finish, install identification after completion of painting.

All engraved labels to meet the following requirements based on Code requirements and industry standard of care:

- Melamine plastic laminate, white with black core, 1/16-inch thick.
- Engravers standard letter style, minimum 3/16-inch high capital letters.
- Drill or punch labels for mechanical fastening except where adhesive mounting is necessary because of substrate. Use self tapping stainless steel screws.
- Dymo tape labels are not acceptable.

- Install an engraved label on each major unit of electrical equipment indicating both equipment name and circuit serving equipment (e.g. "EF-1, CKT. 2P1-1,3,5), including but not limited to the following items:
  - Disconnect switches, identify item of equipment controlled.
  - Relays.
  - Contactors.
  - Time switches.
  - Override switches.
  - Service disconnect and distribution switches, identify connected load.
  - Branch circuit panelboards.
  - Central or master unit of each electrical system including communication/signal systems, unless the unit incorporates its own self-explanatory identification.
- Install engraved on the inside of flush panels, visible when door is opened. Install label on outside of surface panel.

All conductor numbers to meet the following requirements based on Code requirements and industry standard of care:

- Manufacturers standard vinyl-cloth self-adhesive cable and conductor markers of the wraparound type. Preprinted black numbers on yellow field.
- Apply markers on each conductor for power, control, signaling and communications circuits where wires of more than one circuit are present.
- Match conductor identification used in panelboards, shop drawings, contact documents and similar previously established identification for division 26 work.

Label faceplates of electrical outlets and lighting switches with electrical panel number and breaker/circuit number. Label to be white vinyl cloth self adhesive or other if approved by District.

All branch circuit schedules to meet the following requirements based on Code requirements and industry standard of care:

- Provide branch circuit identification schedules, typewritten, clearly filled out, to identify load connected to each circuit and location of load. Numbers to correspond to numbers assigned to each circuit breaker pole position.
- Provide two columns, odd numbers in left column, even numbers in right column, with 3-inch-wide line for typing connected load information.

All relay panel schedules to meet the following requirements based on Code requirements and industry standard of care:

- Provide typewritten schedule to identify the incoming circuit, the controlled load, and the controlling devices for each relay.

All identification for circuit breakers to meet the following requirements based on Code requirements and industry standard of care:

- Provide permanent identification number in or on panelboard dead-front adjacent to each circuit breaker pole position. Square D adhesive is approved, other adhesives by specific prior approval only.
- Horizontal centerline of engraved numbers to correspond with centerline of circuit breaker pole position.

Provide underground utility markers to meet the following requirements based on Code requirements and industry standard of care:

- Inert polyethylene plastic ribbon, 6-inch wide by 4 mil thick.
- Color code as recommended by APWA. Safety Red for electric power distribution. Safety Alert Orange for telephone, signal, data and cable TV.
- Imprint over entire length of ribbon in permanent black letters, the system description, selected from manufacturer's standard legend which most accurately identifies the subgrade system.
- Install continuous tape, 6 to 8 inches below finish grade, for each exterior underground raceway.
- Where multiple small lines are buried in a common trench and do not exceed an overall width of 16 inches, install a single marker. Over 16 inch width of lines, install multiple tapes not over 10 inches apart (edge to edge) over the entire group of lines.

Approved Manufacturers:

- Engraved Labels: Lamicoid
- Conductor Numbers: Brady
- Underground Utilities Ribbon: Allen Systems, Inc.

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications:

- 26 05 26 – Grounding
- 26 05 34 - Boxes

DESIGN STANDARD for Electrical Acceptance Testing

Purpose:

Provide testing, evaluation and calibration of equipment provided, installed and connected in Division 1. This design standard has the purpose of maintaining a consistent method for electrical acceptance testing throughout all renovation and new building projects for the Solano Community College District.

Design Standard:

- Acceptance Testing Criteria: Latest edition of Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems, published by IETA.
- System Description:
  - Performance Requirements:
    - Retain the services of a recognized independent testing firm for the purpose of performing inspections and tests as specified herein.
    - Independent test firm providing report direct to Architect.
    - Material, equipment, labor and technical supervision to perform tests and inspections provided by testing firm.
    - It is the intent of these tests to assure that electrical equipment, Contractor or Owner supplied, is operational within industry and manufacturer's tolerances and is installed in accordance with design Specifications.
    - Tests and inspections determine suitability for energization.
    - Supply to the independent testing organization complete sets of approved shop drawings, coordination study (provided by Contractor's equipment supplier under Contractor's direction, setting of adjustable devices and other information requested by testing agency).
  - Scope of Testing, Evaluation and Calibration:
    - Power transformers.
    - Distribution transformers.
    - Low voltage circuit breakers (greater than 100 amp).

- Medium voltage circuit breakers.
- Metal enclosed switchgear.
- Switchboards.
- Ground fault protective signaling.
- Protective relays and associated instrument transformers.
- Medium voltage cables.
- Bus duct.
- Grounding systems.
- Motor control centers.
- Generators.
- Automatic transfer switches.

– Test Reports:

- Maintain written record of tests.
- At completion of project, assemble and certify a final test report. Submit report to Architect prior to final acceptance to include:
  - Summary of project.
  - Description of equipment tested.
  - Visual inspection report.
  - Description of tests.
  - Test results.
  - Conclusions and recommendations.

- Qualifications of Testing Firm:
  – Corporately independent testing organization which can function as an unbiased testing authority, professionally independent of the manufacturers, suppliers and installers of equipment or systems evaluated by testing firms.
  – Independent organization as defined by OSHA Title 29, Part 1936 and IETA.
  – Regularly engaged in the testing of electrical materials, devices, appliances, electrical installations and systems for the purpose of preventing injury to persons or damage to property and other equipment.
  – Engaged in testing practices for minimum of 2 years.
  – Use only full-time technicians, regularly employed by firm for testing services. Electrically unskilled employees are not permitted to perform testing or assistance of any kind. Electricians and line workers may assist, but may not perform testing or inspection services.
  – Submit proof of above qualifications with Bid Documents.

The following tests are required for field quality control based on industry standard of care:

- Contractor's Responsibilities:
  – Perform routine insulation resistance, continuity and rotation tests for distribution and utilization equipment prior to and in addition to tests performed by testing firm.
  – Notify the testing firm when equipment becomes available for acceptance tests. Coordinate work to expedite project scheduling.
- Testing Firm’s Responsibilities:
  – Notify District prior to commencement of any testing.
  – Report directly to District any systems, material or installation found defective on the basis of acceptance tests.
  – Provide auxiliary portable power supply necessary for conducting tests.

Associated Design Standards and Specifications:

- 26 05 26 - GROUNDING
- 26 05 33 – RACEWAYS
- 26 05 48 – SUPPORTING DEVICES
- 26 05 53 – IDENTIFICATION

DESIGN STANDARD for Occupancy Sensors Standards

Purpose:

Provide occupancy sensors, combined occupancy sensors/wall switches, and/or automatic switches to sense the presence of human activity within the desired space and enable or disable the on/off manual lighting control function provided by local switches. This design standard has the purpose of creating a consistent application of the lighting control requirements throughout the Solano Community College District therefore achieving a standard of quality for maintenance, reliability, and operation throughout all renovation and new building projects.

Design Standard:

- Occupancy Sensors
  - Passive Infrared Sensors:
    - Sensor Function: Detects human presence in the floor area being controlled by detecting changes in the Infrared energy. Sensor detects small movements, i.e., when a person is writing while seated at a desk.

  i) Ultrasonic Occupancy Sensors:
    - Sensor Function: Detects human presence in the controlled floor area by detecting Doppler shifts in 40kHz ultrasound created by sensor.

  - Dual Technology Sensors:
    - General: Sensor has combined capability of passive infrared and ultrasonic sensors as described above.

- Combined Occupancy Sensor/Wall Switches (“Sensor Switches”):
  - Completely self-contained sensor system that fits into a standard single gang box. Internal transformer power supply, latching dry contact relay switching mechanism compatible with electronic ballasts, compact fluorescent, and inductive loads. Triac and other harmonic generating devices are not allowed.

- Upon detection of human activity by the detector, sensor initiates a time delay to maintain the lights on for a preset period of time. The detector shall have field adjustable time delay settings from 30 seconds to 30 minutes.

- Factory set sensors for maximum sensitivity.

- LED lamp built into sensor indicates when occupant is detected.

- Provide zero cross relay control with sensors and sensor/switches; relay contacts close and open when AC voltage signal is at zero.

- Where line voltage sensors and sensor/switches are used, provide to match voltage of controlled circuit.

- Install occupancy sensors as directed by manufacturer's instructions. Provide connections to control circuits, occupancy sensors, power supply pack and low voltage wiring.

- Provide power packs for the sensor to control the number of circuits and/or switch legs within its area of coverage.

- Field adjust each sensor to maximize its coverage of the room space.

- Relocate sensors with ultrasonic technology to avoid being closer to HVAC diffusers and power packs than recommended by manufacturer.

- Field set time delay for each device as noted below:
  - Classrooms and Conference Rooms: 30 minutes.
  - Restrooms: 15minutes. 30 minutes if interlocked with the exhaust fan.
  - Storage Rooms, Janitor's Closets, Unisex Restrooms: 5 minutes.
  - All Other Spaces: 15 minutes.
  - Timer Switches: 2 hours.

- Prior to applying dimming controls, maintain fluorescent lighting at full output for minimum of 100 hours. If this is not done, replace lamps and ballasts of affected luminaires at no cost to Owner.

- Parking lot lighting controlled by occupancy sensor: Provide two occupancy sensors per pole for 360-degree coverage at each pole. Mount sensors at 10 to 15 feet above grade (minimum 5 feet below pole lighting). Provide controller for each luminaire, mounting controller to adjoin luminaire and securing to pole arm. Provide liquid-tight, flexible metallic conduit and raintight junction box as needed to splice wiring between occupancy sensor and HID bi-level controller per manufacturer's installation instructions, and as allowed by luminaire manufacturer. Paint exposed conduit and junction box to match pole finish.

Approved Manufacturers:

- WattStopper

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications:

- 26 50 00 - LIGHTING

DESIGN STANDARD for Daylighting Controls

Purpose:

This design standard has the purpose of creating a consistent application of daylighting controls for the Solano Community College District therefore achieving a standard of operation, reliability and quality throughout all renovation and new building projects.

Design Standard:

Daylighting control systems include the following but not limited to:

- Continuous Dimming Daylighting Controller: Provide dimming control systems capable of controlling 10VDC control input fluorescent dimming ballasts in three output zones via one photocell, with system adjustments capable of being made at control module instead of remote photocell.
- Switched Daylighting Controller: Provide switched control systems capable of controlling three output zones via one photocell with system adjustments capable of being made at control module instead of remote photocell.
- Local Continuous Dimming Photocell: Provide local daylighting photocell capable of directly controlling up to fifty 10VDC control input fluorescent dimming ballasts.
- Local Switched Photocell: interfaces with room occupancy sensor power pack, where available.
- HID High/Low Ballast Switching: Provide HID bi-level HID controller for each HID luminaire in switched daylighting control area. Controller to contain both capacitor and control module, allowing HID ballast to be switched to 50 percent of full power output based on 24VDC control signal.
- Daylighting controls to be UL listed and carry factory warranty for minimum 5-year duration.

All daylighting controls to meet the following requirements based on Code requirements and industry standard of care:

- Continuous Dimming Daylight Controller:
  - Provide dimming control of interior lights in response to light level data, compatible with 0 to 10VDC dimming ballasts. Control system to be open loop, and will provide three output control zones consisting of a 0 to 10VDC signal compatible with fluorescent

dimmable ballasts. Control system includes three relay outputs capable of switching each of the three output zones off after an adjustable time delay when a given channel is fully dimmed.

- Installation
  - Install photocells as directed by manufacturer's instructions. Complete connections to control circuits, photocells, control modules, power supply pack and low voltage wiring.
  - Verify with manufacturer's representative that the sensors and photocells are laid out in compliance to manufacturer's published sensing distribution. Provide additional sensors for complete coverage of the space being served.

Approved Manufacturers:

- Wattstopper

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications:

- 26 50 00 – LIGHTING

DESIGN STANDARD for Liquid-Type Transformers

Purpose:

Provide liquid-type transformers to step-down high voltage power for exterior installations. This design standard has the purpose of providing liquid-type transformers with a level of quality which meets the requirements throughout the Solano Community College District for all renovation and new building projects.

Design Standard:

The liquid-type transformers shall have the following characteristics based on Code requirements and standard industry practices:

- Provide compartmental type, self cooled, tamperproof and weatherproof with pad mounting provisions. Comply within the latest applicable standards of NEMA and ANSI. Provide transformer with no exposed screws, bolts or other fastening devices which are externally removable.
- Voltage: Unless otherwise indicated on Drawings, operate transformers at 3 phase, nominal delta primary to 3 phase wye secondary. Provide standard NEMA, ANSI 3 phase primary taps; that is, 10 percent range of tap voltage adjustment for transformers smaller than 30KVA and 15 percent range tap voltage adjustment for 30KVA and larger.
- Rating: Unless otherwise indicated on Drawings, provide transformer ratings continuous, with an average temperature rise, by resistance, not to exceed 65C in a 30C ambient with 100 percent of rated nameplate load connected to the secondary.
- Provide sealed tank construction of sufficient strength to withstand a pressure of 7 psi without permanent distortion. Provide welded cover with the fastening tamperproof. Provide exterior cooling panels, lifting eyes, jacking pads, and welded cover.
- Provide core and coil assembly core type with aluminum windings. Where wye wye is specified or required provide triplex or 5 legged core design.
- Provide tap changing mechanism for deenergized operation only and externally operable with two 2.5 percent full capacity taps above and two 2.5 percent full capacity taps below normal rated primary voltage.
- Provide high and low voltage compartments located side-by-side separated by a steel barrier. Provide full height air filled terminal compartments with individual doors. Provide high voltage

door fastenings which are not accessible until the low voltage door has been opened. Provide the low voltage door with a three point latching mechanism with vault type handle having provisions for a single padlock. Provide doors with lift off type stainless steel hinges and door stops. Provide removable front sills and ANSI tank grounding provisions in each compartment.

- Provide dead front construction with load break gang operated immersed switch with switch hand located in the high voltage compartment for operating with distribution hot stick. Provide 2 position on-off for radial feed unless loop feed is indicated on Drawings. If loop feed is indicated provide 4 position switch. Provide dry well canister mounted current limiting fuses externally replaceable with distribution hot stick. Size fuses to manufacturer's recommendation to final design load. Provide Series NX Arc-Strangler fuses. Provide distribution class lighting arrester mounted in the high voltage compartment.

- Provide low voltage bushings, 6 hole spade, molded epoxy with blade type spade terminals for NEMA standard hole spacing arranged for vertical take-off. Provide low voltage neutral with insulated busing grounded to the transformer tank by removable grounding strap. Wye-wye connected transformers are provided with the high and low voltage neutrals internally tied with a removable link for testing.

- Provide the following accessories:
  - 1 inch drain valve/sampling device
  - Dial type thermometer
  - Magnetic liquid level gauge
  - Pressure/vacuum gauge
  - Pressure relief valve
  - 1000KVA and larger provide sudden pressure relay

- Provide transformer coils of continuous wire wound construction.

- Provide each coil layer with end fillers or tie-downs to provide maximum mechanical strength. Braze tap terminations directly to bus stubs or lugs firmly mounted.

- Provide windings continuous from start to finish. Splicing is unacceptable. Materials incorporated must have at least a minimum of 1 year of proven field usage. Accelerated laboratory test not acceptable.

- Degrease, clean, phosphatize, prime and finish enclosures with a gray, baked enamel. Visibly ground the core of the transformer to this enclosure by means of a flexible ground strap.

- Mount transformers core and coil on vibration mounting pads designed to suppress transmission of 120 cycle frequencies and harmonics thereof. Arrange and select pads in consideration of core and coil weight. Provide additional noise suppressing mountings external to transformers where transformers are located in mechanical spaces.

- Sound levels guaranteed by manufacturer, 45dB through 150KVA and 50dB through 300KVA.

Liquid-type transformers shall meet the following installation requirements based on Code and standard industry practices:

- Provide transformers with a concrete reinforced pad.

- Mount transformers not closer to combustible materials than allowed by CEC and NFPA. Provide adequate ventilation, mount transformers away from structure as recommended by manufacturer and power utility.

- Provide transformers with 8 inch round by 24 inch (above and below grade) concrete and steel bollards where subject to vehicular traffic.

- Where transformers are grouped exterior together or with switchgear, refinish transformer or switchgear resulting in transformers and switchgear finishes matching in color and type.

- For field quality control:
  - Check for damage and tight connections prior to energizing transformers.
  - Measure primary and secondary voltages and make appropriate tap adjustments.
  - Revise the installation of noisy units to achieve an acceptable noise level or replace with a new unit with an acceptable sound level.

Approved Manufacturers:

- Square D
- General Electric
- Cutler-Hammer

Substitutes Allowed:

Upon review and approval.

Associated Design Standards and Specifications:

- 26 00 00 – Basic Electrical Requirements

DESIGN STANDARD for Dry-Type Transformers

Purpose:

Provide dry-type transformers to step-down high voltage power to end-user voltages (ex. 277V for lighting, 120V for convenience receptacles). This design standard has the purpose of providing dry-type transformers with a level of quality which meets the requirements throughout the Solano Community College District for all renovation and new building projects.

Design Standard:

- Provide transformer coils of the continuous wire wound construction and impregnate with nonhygroscopic, thermosetting varnish prior to baking.
- Maximum temperature rise at full load: 150 degrees above 40C ambient temperature. NEMA TP-1 compliant.
- Provide windings continuous from start to finish. Splicing is unacceptable. Materials incorporated must have at least a minimum of 1 year of proven field usage. Accelerated laboratory test not acceptable.
- All cores manufactured from a high-grade, nonaging silicon steel with high magnetic permeability, low hysteresis and eddy current losses. Magnetic flux densities are kept well below saturation to allow for a minimum of 10 percent over-voltage excitation.
- Ventilated openings must be designed in a manner as to prevent accidental access to live parts.
- Transformers shall be dry-type, with copper windings.
- In locations where the transformer serves computer classrooms, the transformer shall at the least be “K13” rated. Due to code requirements for California, all transformers shall be energy efficient and be rated, TP-1.
- Mount all transformers, core and coil, on vibration mounting pads designed to suppress transmission of 120 cycle frequencies and harmonics thereof. Arrange and select pads in consideration of core and coil weight. Provide additional noise suppressing mountings external to transformers where transformers are located in mechanical spaces.
- Maximum case temperature, 35C above ambient.
- Sound levels guaranteed by manufacturer, 45dB through 150KVA and 50dB through 300KVA.

- Winding Taps:
  - Less than 15KVA: 4-2-1/2 percent FCBN, FCAN.
  - 15KVA and Larger: 4-2-1/2 percent-2+2-.
- Where possible; all transformers shall be placed within the building or below grade.
  - Only under special circumstances and as approved by the District, shall a transformer be allowed to be exterior pad mounted. If the design team provides an exterior yard for equipment, pad mounted transformers may be considered.
  - Provide weather resistant enclosure and factory rating for exterior where shown at exterior locations.
  - Provide transformers with 8-inch round by 24-inch (above and below grade) concrete and steel bollards where subject to vehicular traffic.
- Transformers up to 45KVA may be floor mounted, wall mounted or suspended. Floor mount all transformers above 45KVA rating.
- Transformer Supports: Provide additional vibration isolation hangers and pads, brackets and supports as may be required for a complete installation.
- Provide transformers with concrete working or housekeeping pad minimum 8 inches larger than transformer and minimum 3 inches above finish grade. Install plumb and level. Provide exterior pads of 2500 to 3000 psi concrete reinforced with 8 gauge wire fabric or No. 6 reinforcing bars on 12-inch centers. Provide 10-inch thick base of gravel below pad for support. Pad extends 6 inches on all sides from the exterior most prominent dimension. Provide 3/4-inch by 10-foot ground rod at each corner thermally bonded to No. 2 copper ground conductor, bonded to transformer, and concrete reinforcement.
- Do not mount transformers closer to combustible materials than allowed by CEC.
- Provide adequate ventilation, mount transformers away from adjacent surfaces as recommended by manufacturer.
- Use flexible conduit, 18 inches minimum length, for connections to transformer case. Make connections to side panel or bottom of enclosure. Include ground conductor in flex.
- Mount wall mounted transformers with a minimum of 6'-6" headroom below unit.
- Provide seismic restraints per local requirements.

Approved Manufacturers:

- Square D
- General Electric
- Cutler-Hammer

Substitutes Allowed:

Upon review and approval.

Associated Design Standards and Specifications:

- 26 00 00 – Basic Electrical Requirements

DESIGN STANDARD for Switchboards and Distribution Panelboards

Purpose:

Provide switchboards, distribution panelboards, and branch panelboards for all power and lighting distribution sources to individual buildings and facilities requiring voltages under 600V. This design standard has the purpose of providing switchboards and distribution panels with a level of quality which meets the requirements throughout the Solano College District for all renovation and new building projects.

Design Standard:

All switchboards to meet the following requirements based on Code requirements and industry standard of design and care:

- Install equipment in conformance with work space requirements of CEC.
- Locate equipment in rooms or spaces dedicated to such equipment.
- Enclosures:
  - Free standing, dead front with front accessibility.
  - Framework constructed of formed, code gauge steel, rigidly welded and bolted together to support coverplates, bussing, and component devices during shipment and installation. Bolt steel base channels to the frame to rigidly support the entire shipping section for moving on rollers and floor mounting.
  - Provide each section with individually removable top plate and open bottom to permit installation and termination of service and feeder raceways.
  - Removable Front Covers: Screw attached.
  - Provide removable hinge pins on hinged doors.
  - Paint interior and exterior surfaces. Medium light gray finish, applied by electro-deposition process over an iron phosphate pretreatment.
  - All panel boards, switchboards, motor control centers and other components of electrical systems shall be Nema 1 when enclosed within a building. Except when subjected to moisture, the housing shall be Nema 3R.
  - All floor standing equipment shall be mounted on a minimum 6” reinforced concrete pad. All panelboards shall be provided with a minimum of 30% expansion capacity.
- Bussing:
  - Material: Plated copper.
  - Ground Bus: Full length of switchboard, 50 percent of phase bus capacity.
  - Neutral Bus: 100 percent rated, full length of switchboard.
- Provide fully rated integrated equipment rating greater than the available fault current. Series rated switchboards are not acceptable. Coordinate with serving electric utility.
- Lugs: Compression type rated for both aluminum and copper conductors.
- Molded Case Circuit Breakers are to be NEMA AB 1, with standard frame sizes, trip ratings, and number of poles, and interrupting capacity to meet available fault currents. Molded-case circuit breakers are also identified as:
  - Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250A and larger.
  - Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
  - Electronic Trip Unit Circuit Breakers: RMS sensing; field-replaceable rating plug; with the following field-adjustable settings:
    - Instantaneous trip.
    - Long- and short-time pickup levels.
    - Long- and short-time adjustments.
    - Ground-fault pickup level, time delay, and I^2t response.
  - Current-Limiting Circuit Breakers: Frame sizes 400A and smaller; let-through ratings less than NEMA FU 1, RK-5.
  - Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker; trip activation on fuse opening or on opening of fuse compartment door.
- Enclosed, Insulated-Case Circuit Breaker: Fixed mounting, manually closed, fully rated, encased-power circuit breaker with interrupting capacity rating to meet available fault current.

- Two-step, stored energy closing.
- Microprocessor-based trip units with interchangeable rating plug, LED trip indicators, and the following field-adjustable settings:
    - Instantaneous trip.
    - Long- and short-time pickup levels.
    - Long- and short-time adjustments.
    - Ground-fault pickup level, time delay, and I^2t response.
- Remote trip indication and control capability.
- Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.
- Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function.

All lighting and appliance branch panelboards to meet the following requirements based on Code requirements and industry standard of design and care:

- Enclosures:
    - Flush Panelboards Rated 400 Amp or Less: Maximum enclosure depth, 5-3/4-inches.
    - Wiring Gutter Size: 5 inches at sides, 6 inches top and bottom.
    - Finish: Galvanized steel constructed in accordance with UL 50 requirements. Front shall have ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.
    - Hinged door with door-in-door construction, flush lift latch and lock, two keys per panel. Key panelboards alike.
- Interior:
    - Copper bar with suitable electroplating (tin) for corrosion control at connection.
    - Provide copper ground bar to accommodate specified terminal lugs.
    - Predrill bus for bolt-on type circuit breakers.
    - Provide double lugs or landing pads for feed through feeders.
    - Provide feed through feeder lugs for field connection of multi-section flush panel sections, where applicable.
    - When distribution panel is feeding isolated ground circuits, provide isolated ground bar, insulated from panelboard enclosure, to accommodate specified terminal lugs.
    - Provide fully rated rated integrated equipment rating greater than the available fault current. Coordinate available fault current with serving electric utility. Minimum rating is 10,000 amps.
    - Lugs: Compression type rated for both aluminum and copper conductors.
    - Provide interior wiring diagram, neutral wiring diagram, UL listed label and short circuit current rating on the interior or in a booklet format inserted in a sleeve inside the panel cover.
- Main Circuit Breaker, Where Applicable:
    - UL listed to accept solid or stranded, aluminum or copper conductors. Lugs: suitable for 90C rated wire sized according to the 75C temperature rating per CEC.
- Branch Circuit Breakers:
    - Bolt-on type bus connectors.
    - UL listed to accept solid or stranded, aluminum or copper conductors. Lugs: suitable for 90C rated wire sized according to the 75C temperature rating per CEC.
    - UL listed for use with the following factory installed accessories: shunt trip, auxiliary switch and alarm switch.
    - UL listed with the following ratings:
        - 15 to 125 amp breakers: Heating, Air Conditioning, and Refrigeration (HACR).
        - 15 to 30 amp breakers: High Intensity Discharge (HID) lighting.
        - 15 to 20 amp breakers: Switch Duty (SWD).
    - When indicated on drawings, provide 200 percent rated copper neutral assembly.
    - When indicated on drawings, provide an isolated ground bus in addition to the equipment ground bus.

All power distribution panelboards to meet the following requirements based on Code requirements and industry standard of design and care:

- Enclosures:

- Provide boxes with removable blank end walls and interior mounting studs. Provide interior support bracket for ease of interior installation.
- Finish: Galvanized steel constructed in accordance with UL 50 requirements. Front shall have ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.
- Hinged door with door-in-door construction, flush lift latch and lock, two keys per panel. Key panelboards alike.

- Interior:
  - Copper bar with suitable electroplating (tin) for corrosion control at connection.
  - Provide copper ground bar to accommodate specified terminal lugs.
  - Panelboard interior: three flat bus bars stacked and aligned vertically with glass reinforced polyester insulators laminated between phases. Molded polyester insulators shall support and provide phase isolation to entire length of bus.
  - Predrill bus for bolt-on type circuit breakers.
  - Provide double lugs or landing pads for feed through feeders.
  - Provide feed through feeder lugs for field connection of multi-section flush panel sections.
  - When distribution panel is feeding isolated ground circuits, provide isolated ground bar, insulated from panelboard enclosure, to accommodate specified terminal lugs.
  - Fully equip unused spaces for future devices, including manufacturer required connectors and mounting hardware.
  - Provide fully rated integrated equipment rating greater than the available fault current. See drawings for available fault current. Coordinate available fault current with serving electric utility. Minimum rating is 10,000 amps.
  - Lugs: Compression type rated for both aluminum and copper conductors.
  - Provide interior wiring diagram, neutral wiring diagram, UL listed label and short circuit current rating on the interior or in a booklet format inserted in a sleeve inside the panel cover.
  - When indicated on drawings, provide 200 percent rated copper neutral assembly.
  - When applicable, provide an isolated ground bus in addition to the equipment ground bus.

All instrumentation equipment to meet the following requirements based on Code requirements and industry standard of design and care:

- Multifunction Digital-Metering Monitor: Microprocessor-based unit suitable for three- or four-wire systems and with the following features:
- Switch-selectable digital display of the following values with maximum accuracy tolerances as indicated:
  - Phase Currents, Each Phase: Plus or minus 1 percent.
  - Phase-to-Phase Voltages, Three Phase: Plus or minus 1 percent.
  - Phase-to Neutral Voltages, Three Phase: Plus or minus 1 percent.
  - Megawatts: Plus or minus 2 percent.
  - Megavars: Plus or minus 2 percent.
  - Power Factor: Plus or minus 2 percent.
  - Frequency: Plus or minus 0.5 percent.
  - Megawatt Demand: Plus or minus 2 percent; demand interval programmable from 5 to 60 minutes.
  - Accumulated Energy, Megawatt Hours: Plus or minus 2 percent. Accumulated values unaffected by power outages up to 72 hours.

Approved Manufacturers:

- Square D
- General Electric
- Cutler-Hammer
- Eaton

Substitutes Allowed:

Upon review and approval.

Associated Design Standards and Specifications:

- 26 00 00 – Electrical Basic Requirements

DESIGN STANDARD for Motor Control Centers

Purpose:

This design standard has the purpose of creating a consistent application of motor control centers throughout the Solano Community College District therefore achieving a standard of maintenance, reliability and quality throughout all renovation and new building projects.

Design Standard:

All motor control centers to meet the following requirements based on Code requirements and industry standard of care:

- Regulatory Requirements: The MCC must conform to Underwriters Laboratory (UL) 845, current revision, CSA, EEMAC, NEMA ICS-2, the latest version of the National Electrical Code. The MCC must be manufactured in an ISO 9001 certified facility.
- Do not place motor control centers in hazardous locations. The area chosen shall be well ventilated and totally free from humidity, dust and dirt. The temperature of the area shall be no less than 32F and no greater than 104F. For indoor locations, protection must be provided to prevent moisture entering the enclosure.
- Locate motor control centers in an area which allow a minimum of 3 feet of free space in front of front-of-board construction. An additional 3 feet should be allowed in the rear of back-to-back construction. This free space will give adequate room to remove and install units. Provide a minimum of 0.5-inch space between the back of front-of-board MCCs and a wall (6 inches required for damp locations).
- Assemble the MCCs in the factory on a smooth level surface so that sections are properly aligned. Provide a similar smooth and level surface for installation. The surface under a MCC shall be of a noncombustible material unless bottom plates are installed in each vertical section.

Motor control centers shall include and have the following characteristics but not limited to:

- Materials:
  - Each MCC shall consist of one or more vertical sections of heavy gauge steel bolted together to form a rigid, free-standing assembly. Mount a removable 7 gauge structural steel lifting angle full width of the MCC lineup at the top. Mount removable 7 gauge bottom channel sills underneath front and rear of the vertical sections extending the full width of the lineup. Vertical sections made of welded side-frame assembly formed from a minimum of 12 gauge steel. Internal reinforcement structural parts shall be of 11 gauge steel to provide a strong, rigid assembly. Construct and package the entire assembly to withstand stresses included in transit and during installation.
- MCC Finish:
  - Provide steel parts with UL and CSA listed acrylic/alkyd baked enamel paint finish, except plated parts used for ground connections. Painted parts shall undergo a multi-stage treatment process, followed by the finishing paint coat.
  - Pretreatment shall include:
    - Hot alkaline cleaner to remove grease and oil.
    - Iron phosphate treatment to improve adhesion and corrosion resistance.
  - Apply paint using an electrodeposition process to ensure a uniform paint coat with high adhesion.
  - Test the standard paint finish to UL 50 per ASTM B117 with no greater than 0.125 in loss of paint from a scribed line.
  - Paint Color: No. 49 medium light gray per ANSI standard Z55.1-967 on surfaces unless specified otherwise.
- Structures:
  - Totally enclose structures, dead-front, free-standing assemblies. Structures capable of being bolted together to form a single assembly.
  - The overall height of the MCC shall not exceed 90 inches (not including base channel). Base channels, of 1.5 inches in height, shall be removable. The total width of one section shall be 20 inches.
  - Structures: NEMA/EEMAC 1 general purpose, 12 (industrial duty), or 3R non-walk-in (rainproof) depending on installation.
  - Each 20-inch wide standard section shall have the necessary hardware and bussing for modular plug-in units to be added and moved around. Cover unused space with hinged blank doors and equipped to accept future units. Cover vertical bus openings with manual bus shutters.
  - Each section shall include a top plate. NEMA/EEMAC 12 shall also include a bottom plate. Top and bottom plates removable for ease in cutting conduit entry openings.

- Wireways:
  - Structures shall contain a minimum 12-inch high horizontal wireway at the top of each section and a minimum 6-inch high horizontal wireway at the bottom of each section. These wireways shall run the full length of MCC to allow room for power and control cable to connect between units in different sections.
  - Provide a full-depth vertical wireway in each MCC section that accepts modular plug-in units. The vertical wireway shall connect with both the top and bottom horizontal wireway and isolated from unit interiors by a full height barrier. The vertical wireway 4 inches wide minimum with a separate hinged door. There should be a minimum of 4,000 in3 of cabling space available. Access to the wireways shall not require opening control unit doors. Structures that house a single, full section control unit are not required to have vertical wireways. Those control units must open directly into the MCC horizontal wireways.
- Barriers:
  - Isolate power bussing and splice connections from the unit compartments and the wireways. Mount the horizontal bus onto a glass filled polyester support assembly that braces the bus against the forces generated during a short circuit. Isolate the horizontal bus from the top horizontal wireway by a two-piece grounded steel barrier. Provide removable barrier to allow access to the bus and connections for maintenance.
  - House the vertical bus in a molded glass-filled polyester support that provides bus insulation and braces the bus against the forces generated during a short circuit. These supports shall have openings every 3 inches for unit stab-on connections. Provide each opening with a manual shutter to close off the stab opening. Attach these shutters to the structure so that when they are removed they are retained in the structure and are readily accessible for use should a plug-in unit be removed from the MCC.
  - Provide barriers in the vertical structure and unit designs to prevent the contact of any energized bus or terminal by a fishtape inserted through the conduit or wireway areas.
- Bussing:
  - Bussing and Connectors: Tin-plated or silver-plated copper.
  - Main Horizontal Bus: Rated at 600A, 800A, 1200A, 1600A, or 2000A continuous and shall extend the full length of the MCC. Base bus ratings on 65C maximum temperature rise in a 40C ambient. Provide provisions for splicing additional sections onto either end of the MCC.
  - Horizontal Bus Splice Bars: Preassembled into a captive bus stack. This bus stack is installed into the end of the MCC power bus to allow the installation of additional sections. The main bus splice shall utilize four bolts, two on each side of the bus split, for each phase. Additional bolts must not be required when splicing higher amperage bus. The splice bolts shall secure to self clenching nuts installed in the bus assembly. It shall be possible to maintain any bus connection with a single tool. "Nut and bolt" bus connections to the power bus shall not be permitted.
  - Provide each section that accepts plug-in units with a vertical bus for distributing power from the main bus to the individual plug-in starter units. This bus shall be of the same material and plating as the main bus, and rated at 300A or 600A continuous. Connect the vertical bus directly to the horizontal bus stack without the use of risers or other intervening connectors. It shall be possible to maintain the vertical to horizontal bus connection with a single tool. "Nut and bolt" bus connections to the power bus are not permitted. When a back-to-back unit arrangement is utilized, provide separate vertical bus for both the front and rear units.
  - Provide a tin-plated copper ground bus that runs the entire length of the MCC. Ground bus: 0.25 by 1 inch and rated for 300 amps. Provide a compression lug in the MCC for a 4/0-250 kcmil ground cable. Provide the ground bus with six 0.38-inch holes for each vertical section to accept customer-supplied ground lugs for any loads requiring a ground conductor.
  - Each vertical section shall have a copper vertical ground bus that is connected to the horizontal ground bus. Install this vertical ground bus so that the plug-in units engage the ground bus prior to engagement of the power stabs and shall disengage only after the power stabs are disconnected upon removal of the plug-in unit.
  - Brace the power bus system for a short circuit capacity as determined by information from the utility and a short circuit study.
- Unit Construction:
  - Units with circuit breaker disconnects through 250A frame, and fusible switch disconnects through 200A, shall connect to the vertical bus through a spring reinforced stab-on connector. Connect units with larger disconnects directly to the main horizontal bus with appropriately sized cable or riser bus. Stabs on plug-in units shall be solidly bussed to the unit disconnect. Cabled stab assemblies are not permitted.
  - Conducting parts on the line side of the unit disconnect shrouded by a suitable insulating material to prevent accidental contact with those parts.
  - Unit mounting shelves shall include hanger brackets to support the unit weight during installation and removal. Plug-on units shall use a twin-handle camming lever located at

the top of the bucket to rack in and out the plug-on unit. The cam lever shall work in conjunction with the hanger brackets to ensure positive stab alignment.

- A cast metal handle operator must be provided on each disconnect. With the unit stabs engaged into the vertical phase bus and the unit door closed, the handle mechanism shall allow complete ON/OFF control of the unit disconnect with clear indication of the disconnects status. Circuit breaker operators shall include a separate TRIPPED position to clearly indicate a circuit breaker trip condition. It shall be possible to reset a tripped circuit breaker without opening the control unit door.
- A mechanical interlock shall prevent the operator from opening the unit door when the disconnect is in the ON position. Another mechanical interlock shall prevent the operator from placing the disconnect in the ON position while the unit door is open. It shall be possible for authorized personnel to defeat these interlocks.
- Provide a nondefeatable interlock between the handle operator and the cam lever to prevent installing or removing a plug-on unit unless the disconnect is in the OFF position.
- The plug-in unit shall have a grounded stab-on connector which engages the vertical ground bus prior to, and releases after, the power bus stab-on connectors.
- Provide provisions for locking disconnects in the OFF position with up to three padlocks.
- Locate handle mechanisms on the left side to encourage operators to stand to the left of the unit being switched.
- Unit construction shall combine with the vertical wireway isolation barrier to provide a fully compartmentalized design.

- High Density Unit Construction:
  - Units with circuit breaker disconnects through 100 A frame, and fusible switch disconnects through 100 A, shall connect to the vertical through a spring-reinforced stab-on connector. Cable connect stabs on plug-on units to the unit disconnect. High density units shall accept Class J fuses only and to be rated for 100,000 AIR (amperes interrupting rating) at 600 volts. Rate high density units with breakers for 65,000 AIR at 480 volts.
  - Conducting parts on the line side of the unit disconnect be shrouded by a suitable insulating material.
  - Unit mounting shelves shall include hanger brackets to support the unit weight during installation and removal. High density units installable without the assistance of a camming device so as to allow maximum accessibility with the unit installed.
  - Provide a cast metal handle operator on each disconnect. With the unit stabs engaged into the vertical phase bus and the unit door closed, the handle mechanism shall allow complete ON/OFF control of the unit disconnect with clear indication of the disconnects status. Circuit breaker operators shall include a separate TRIPPED position to clearly indicate a circuit breaker trip condition. It shall be possible to reset a tripped circuit breaker without opening the control unit door.
    - A mechanical interlock shall prevent an operator from opening the unit door when the disconnect is in the ON position. Another mechanical interlock shall prevent an operator from placing the disconnect in the ON position while the door is open. It shall be possible for authorized personnel to defeat these interlocks.
    - Provide a nondefeatable interlock between the handle operator and the structure to prevent installing or removing a plug-on unit unless the disconnect is in the OFF position. The plug-on unit shall have a grounded stab-on connector which engages the vertical ground bus prior to, and releases after, the power bus stab-on connectors.
  - Provide provisions for locking disconnects in the OFF position with up to three padlocks.
  - Locate handle mechanisms on the bottom left side of the unit and operate horizontally to encourage operators to stand to the left of the unit being switched.
  - Unit construction shall combine with the vertical wireway isolation barrier to provide a fully-compartmentalized design.
  - Up to a maximum of 12 high-density units can be installed per vertical section without placement restrictions in new or existing applications.
- Components:
  - Combination Starters:
    - Combination starters shall utilize a unit disconnect as specified in the previous article. Furnish magnetic starters in combination starter units. Starters shall utilize NEMA/EEMAC rated contactors. Provide starters with a 3 pole, external manual reset, overload relay for thermal overload units.
    - When provided, control circuit transformers shall include internal primary protection 208V to 480V (separate primary fuse on 600V) and one secondary fuse (in the nonground secondary conductor). Size the transformer to accommodate the contactor(s) and connected control circuit loads. The transformer rating fully visible from the front when the unit door is opened.

- When a unit control circuit transformer is not provided, the disconnect shall include an electrical interlock for disconnection of externally powered control circuits.
- Provide auxiliary control circuit interlocks where indicated. Auxiliary interlocks field convertible to normally open or normally closed operation.
- Mount NEMA/EEMAC Size 1-4 starters directly adjacent to the wireway so that power wiring (motor leads) shall connect directly to the starter terminals without the use of interposing terminals. Arrange larger starters so that power wiring may exit through the bottom of the starter cubical without entering the vertical wireway.

– Terminal Blocks:

- Provide Type B wiring. Provide starter units with unit control terminal blocks.
- Terminal Blocks: Pull-apart type 600 volt and rated at 25 amps. Tin plate current carrying parts. Terminals accessible from inside the unit when the unit door is opened. Terminal blocks shall be DIN rail mounted with the stationary portion of the block secured to the unit bottom plate. Use the stationary portion for factory connections, and shall remain attached to the unit when removed. The terminals used for field connections shall face forward so they can be wired without removing the unit or any of its components.
- When Type C wiring is specified, provide starter units with unit control terminal blocks as described for Type B wiring. Provide an additional set of identical terminal blocks in a terminal compartment located in each section. Prewire these terminal blocks to the unit terminals so that field control connections can be made at the terminal compartments.

• Components For High Density Units:

– High Density Combination Starters:

- High density combination starters shall use a unit disconnect as specified in the previous article. NEMA rated units shall use magnetic starters and furnished in high density combination starter units. Starters shall use NEMA/EEMAC-rated contactors. Provide starter units with a 3 pole, external manual reset, overload relay for motor overload protection.
- When provided, control circuit transformers shall include internal primary protection 280V to 480V, and one secondary fuse (in the nonground secondary conductor.) Size the transformer to accommodate the contactor(s) and connected control circuit loads.
- When a unit control circuit transformer is not provided, the disconnect shall include an electrical interlock for disconnection of externally powered control circuits.
- Provide auxiliary control circuit interlocks. For NEMA rated starters, auxiliary interlocks field convertible to normally open or normally closed operation.
- Mount NEMA/EEMAC size 1 starters directly adjacent to the wireway so that power wiring (motor leads) will connect directly to the starter terminals.

– Terminal Blocks for High Density Units

- Provide starter units with unit control terminal blocks.
- Terminal Blocks: Pull-apart type, 250V, and rated for 10 amperes. Tin plate current-carrying parts. Terminals accessible from inside the unit when the unit door is opened. Use the stationary portion of the terminal block for factory connections and will remain attached to the unit when the portion used for field connections is removed. The terminals used for field connections accessible so they can be wired without removing the unit or any of its components.

– Pilot Device Control Panel: Provide each unit with a control panel for up to a maximum of four pilot devices. Control panel to be removable by loosening two semi-captive fasteners for customer access.

Approved Manufacturers:

- Square D
- General Electric
- Cutler-Hammer

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications:

- 26 00 00 – Electrical Basic Requirements

DESIGN STANDARD for Wiring Devices

Purpose:

This design standard has the purpose of creating a consistent application of wiring devices throughout the Solano Community College District therefore achieving a standard of maintenance, reliability and quality throughout all renovation and new building projects.

Design Standard:

Wiring devices are identified as the following but not limited to:

- Wall Switches:
  - Toggle type
  - Pilot light toggle type (handle is on when load is energized)
  - Lighted handle toggle type (handle is on when load is not energized)
  - Key switches
- Receptacles:
  - Duplex receptacles
  - Isolated ground receptacles
  - Ground Fault Circuit Interrupter (GFCI) receptacles
  - Tamper Resistant receptacles
  - Special Purpose Receptacles (NEMA type as applicable)
- Wall Dimmers

All wiring devices to meet the following requirements based on Code requirements and industry standard of care:

- For Wall Switches:
  - Characteristics: Toggle type, quiet acting, 20 amp, 120/277 volt, UL listed for motor loads up to 80 percent of rated amperage.
  - Pilot Light Switches: Lighted handle, toggle type, red unless noted otherwise, neon pilot lamp. Pilot lamp energized when load is energized.
  - Lighted Handle Switches: Lighted handle, quiet acting, 20 amp, 120/277 volt, toggle type, red unless noted otherwise, neon lamp. Lamp energized when load is not energized.
  - Key Switches: 20 amp/120-277 volt, black key guide.
  - Finish: As selected by District. Provide District with optional colors for selection prior to ordering.
  - Appearance: Provide lighting switches and receptacles of common manufacturer and appearance.
- For Receptacles:
  - Commercial Grade: Riveted. Brass ground contact on steel mounting strap. 20 amp.
  - Decorative Type: Back and side wired. 20 amp.
  - Isolated Ground Receptacle: Isolated ground "delta" on receptacle face, same finish as standard duplex receptacles, 20 amp.
  - Ground Fault Circuit Interrupter (GFCI) Receptacle: Meets or exceeds UL943 (Class A GFCI), UL498. Feed through type, back-and-side wired, 20 amp, 125VAC.
  - Tamper-Resistant Receptacle: 20 amp, 125VAC, complies with CEC requirements for tamper-resistant outlets in areas where children are cared for.
  - UL Wet-Listed Covers While-In-Use: NEMA 3R when closed over energized plug. Vertical mount for duplex receptacle. Provide continuous use cover with cover capable of closing over energized cord cap with bottom aperture for cord exit.
- Coverplates shall be nylon thermoplastic.
- For Wall Dimmers, size dimmers to accept connected load. Do not cut fins. Where dimmers are ganged together, provide a single multigang coverplate.
- Conform to requirements of the CEC, latest adopted version with amendments by local AHJs.
- Furnish products listed by UL or other testing firm acceptable to AHJ.
- Federal Specification Compliance: Comply with Federal Specification WS896 and WC596 for switches and receptacles respectively.

- NEMA Configuration: Comply with NEMA configurations and standards for general and special purpose wiring devices.
- Orientation:
  - Wall-Mounted Receptacles: Install with long dimension oriented vertically at centerline height shown on Drawings or specified herein.
  - Vertical Alignment: When more than one outlet is shown on Drawings in close proximity to each other, but at different elevations, align the outlets on a common vertical center line for best appearance. Verify with Architect.
- Locate receptacles in convenient locations for the users. Do not locate receptacles where they will be inaccessible or inconvenient to the users.
- For quality control, provide testing of wiring devices to ensure electrical continuity of grounding connections, and after energizing circuitry, to demonstrate compliance with requirements. Test receptacles for line to neutral, line to ground and neutral to ground faults. Contractor to correct any defective wiring.

Approved Manufacturers:

- Cooper
- Hubbell
- Leviton
- Pass & Seymour

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications:

- 26 05 34 - BOXES

DESIGN STANDARD for Overcurrent Protective Devices

Purpose:

This design standard has the purpose of creating a consistent application of overcurrent protective devices throughout the Solano Community College District therefore achieving a standard of maintenance, reliability and quality throughout all renovation and new building projects.

Design Standard:

Overcurrent protective devices are identified as the following but not limited to:

- Fusible switches.
- Fuses.
- Circuit breakers.
- Fuse cabinet.

All overcurrent protective devices to meet the following requirements based on Code requirements and industry standard of care:

- For each class and ampere rating of fuse installed, provide the following quantities of spares for quantity of fuses installed:
  - 0 to 24: Provide 6 spare.
  - 25 to 48: Provide 9 spare.
  - 49 and Above: Provide 12 spare.
- Provide testing of ground fault interrupting breakers.
- Provide circuit breakers for installation in panelboards, individual enclosures or combination motor starters.
- Provide ground fault interrupter circuit breakers for equipment in damp or wet locations.
- Provide device on handle to lock breaker in "ON" position for breakers feeding time switches, night lights and similar circuits required to be continuously energized.

Approved Manufacturers:

- Fuses:
  - Bussmann Division
  - McGraw-Edison
  - Shawmut Division
  - Gould Electronic
  - Littelfuse
- Circuit Breakers and Fusible Switches:
  - Eaton Electrical
  - General Electric
  - Siemens
  - Square D
- Fuse Cabinet:
  - Bussmann
  - Circle AW
  - Ferraz-Shawmut
  - Littelfuse
  - Siemens
  - Square D

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications:

- 26 00 00 – Basic Electrical Requirements

DESIGN STANDARD for Circuit and Motor Disconnects

Purpose:

This design standard has the purpose of creating a consistent application of circuit and motor disconnects throughout the Solano Community College District therefore achieving a standard of maintenance, reliability and quality throughout all renovation and new building projects.

Design Standard:

Circuit and motor disconnects are identified as the following but not limited to:

- Toggle type disconnect switches.
- Manual motor starters.
- Safety switches.

All circuit and motor disconnects to meet the following requirements based on Code requirements and industry standard of care:

- Provide disconnect switch in sight of each motor location unless otherwise noted.
- Motors within sight of and not more than 20 feet from motor branch circuit device do no require a disconnect switch at the motor. Provide locking device on circuit protective device.
- Provide disconnect switch in site of each motor controller. Motor controller disconnect equipped with lock-out/tag-out padlock provisions do not require a disconnect switch at the controlled motor location.
- Recessed fractional horsepower exhaust ceiling or wall fan units; no disconnect switch required at motor if unit is recessed.
- Switches disconnect phase legs.
- Coordinate fuse ampere rating with installed equipment. Fuse ampere rating variance between original design information and installed equipment, size in accordance with Bussmann Fusetron 40C recommendations. Do not provide fuses of lower ampere rating than motor starter thermal units.

- For toggle type disconnect switches:
  - Rating: 120 volt, 1 pole, 20 amp, 1 HP maximum.
  - Enclosure: NEMA 1 indoors, NEMA 3R raintight outdoors.
- For manual motor starters:
  - Characteristics:
    - Quick-make, quick-break.
    - Thermal overload protection.
    - Clearly label device for maximum voltage, current and horsepower.
    - Square D, Class 2510.
  - Enclosure: NEMA 1 indoors, NEMA 3R raintight outdoors.
- For safety switches:
  - Heavy duty, fused type, dual rated, quick-make, quick-break with fuse rejection feature for use with Class R fuses only, unless other fuse type is specifically noted.
  - Enclosures: NEMA 1 indoors, NEMA 3R raintight outdoors.
  - Switches clearly marked for maximum voltage, current and horsepower.
  - Equip enclosure with defeatable cover interlock.
  - Switches rated for maximum available fault current.
- For combination starters:
  - Heavy duty, fused type, dual rated, quick-make, quick-break with fuse rejection feature for use with Class R fuses only, unless other fuse type is specifically noted.
  - Enclosures: NEMA 1 indoors, NEMA 3R raintight outdoors.
  - Clearly mark switches for maximum voltage, current and horsepower.
  - Provide coil voltage coordinated with control requirements.
  - Provide thermal overload units sized to equipment nameplate rating.
  - Provide one N.C. and one N.O. auxiliary contacts.
  - Provide prewired hand/off/auto switch and start button.

Approved Manufacturers:

- Toggle Type Disconnect Switches:
  - Cooper
  - Hubbell
  - Leviton
  - Pass & Seymour
  - Slater
- Manual Motor Starters:
  - Eaton Electrical
  - Siemens
  - Square D
- Safety Switches:
  - Eaton Electrical
  - General Electric
  - Siemens
  - Square D

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Specifications:

- 26 00 00 – Basic Electrical Requirements

DESIGN STANDARD for Lighting

Purpose:

This design standard has the purpose of specifying complete luminaires with a level of quality which meets the requirements throughout the Solano Community College District for all renovation and new building projects.

Design Standard:

- All lighting shall be designed per the latest edition of the California Electrical Code, California Energy Code, and California Green Energy standards.
- Comply with the recommendations of the Illuminating Engineering Society (IES).
- Comply with applicable ANSI standards pertaining to lamp materials, lamp ballasts, drivers, transformers, and luminaire.
- Comply with applicable NEMA standards pertaining to lighting equipment.
- Comply with fallout and retention requirements of CBC for diffusers, baffles, louvers, and the like.
- Provide all structural and seismic supports as required by the California Building Code and approved by DSA.
- All lighting fixtures, and their placement in the building, shall be selected with future maintenance in mind.
  - No fixture shall be selected or mounted that will require more than one person to service the fixture.
  - Nor shall they be located where a 6-10 foot ladder cannot readily access the fixture for re-lamping or other maintenance.
- Provide luminaires and lamp holders which comply with UL standards and have been UL listed and labeled for location and use indicated.
- Fixtures shall have a minimum 5-year warranty from the manufacturer.
- Provide spares as noted:
  - Furnish 2 percent extra lens or louvers for each size and type of luminaire.
  - Furnish 5 percent extra drivers for each size and type of fixture.
  - Furnish 10% extra lamps for each site and type installed.
- Light Emitting Diode (LED) technical requirements:
  - Luminaire manufactures shall have a minimum of five (5) years' experience in the manufacture and design of LED products. All LED sources shall be of proven quality from established and reputable LED manufacturers. Acceptable LED manufactures unless otherwise noted are:
    - Cree, Inc.
    - Philips Lighting
    - Osram Optronic Semiconductors.
    - Nichia
    - GE Lumination
  - LED luminaires and components shall be UL listed.
  - LEDs shall have a rated source life of 50,000 hours under normal operating conditions. LED "rated source life" is defined as the time when a minimum of 70% initial lumen output remains.
  - LED's shall be adequately protected from moisture or dust in interior applications.
  - Luminaire assembly shall include a method of dissipating heat so as to not degrade life of source, electronic equipment, or lenses. LED luminaire housing shall be designed to transfer heat from the LED board to the outside environment. Thermal management shall be passive design. The use of fans or other mechanical equipment is not allowed.
  - LED drivers shall have reverse polarity protection, open circuit protection and a minimum 80 percent efficiency. Class A noise rating.
  - LED fixtures shall be capable of full and continuous dimming. There shall be no visible flicker to the unaided eye over the dimming range.
  - Photometry shall comply with IESNA LM-79 "Electrical and photometric measurements of solid state lighting products"
  - Luminaires shall be constructed such that LED modules may be replaced or repaired without the replacement of the whole fixture.
  - The LED arrays shall be constructed such that a failure of an individual LED will not result in the loss of the entire array.

Interior lighting shall be designed with the following considerations:

- Interior lighting shall be LED based. The use of non-LED fixtures is not allowed without the approval of the district on a case by case basis.
- Where lighting control systems are required per Title 24, the system shall include lighting relay control panels, daylight harvesting, motion sensors, switch inputs, and connections to other building systems (fire alarm, security and energy management systems for HVAC.)

- For classrooms supporting AV presentations:
  - Provide multi-level switching and/or dimming to switch front of class to support AV presentations while allowing some light in the student area for note taking.
  - Provide a lighting control location at front of class for easy control by instructor.
- Restroom lighting is recommended to be specified with lenses for ease of cleaning. Avoid installation of lighting over stalls (hard to maintain).
- Consider the high surface brightness of LEDs and specify downlights with diffusing lenses or recessed LED arrays within the fixtures to minimize glare.
- Under cabinet lighting shall be low profile and easily integrate into the furniture.
- Non-electric supplied exit signs shall be non-radioactive photoluminescent signs. Tritium powered (radioactive) exit signs are prohibited for installation on campus.
- Each luminaire shall consist of an assembly that utilizes LEDs as the light source. In addition, a complete luminaire shall consist of a housing, LED array, and electronic driver.
- Luminaire shall be high efficacy with a minimum of 60 lumens per watt.
- Where recessed luminaires are installed in cavities intended to be insulated, provide IC rated luminaire or other code approved installation.
- Recessed 2'x4' luminaires shall employ concealed LED's with a center panel.
- Luminaires installed under canopies, roof or open porches, and similar damp or wet locations, shall be UL listed for damp or wet locations.
- Recessed luminaires shall have the frame compatible with ceiling material installed at particular location. Provide proper factory trim and frame to fit location and ceiling material.
- Finishes:
  - Manufacturer's standard finish (unless otherwise indicated) over a corrosion resistant primer.
  - Interior Light Reflecting Finishes: White or specular finish with not less than 85 percent reflectance.
- Light Transmitting Components:
  - Plastic diffusers, molded or extruded of 100 percent virgin acrylic.
  - Prismatic acrylic, extruded, flat diffusers, 0.125 inch overall thickness, unless otherwise noted

Exterior Lighting shall be designed with the following considerations:

- Confirm the color kelvin temperature rating with respect to security, proximity to observatories, and as directed by District. For example, the International Dark-Sky Association recommends a warmer 3000K rating or lower for minimizing light pollution and visual comfort. However, parking areas and higher security locations may consider a cooler 5000K rating or higher for increased visibility.
- There is a need to connect exterior fixtures to on site lighting circuits, some on night lighting circuits. Verify requirements for each of the campuses or as directed by the District.
- Provide accent lighting for building (i.e. entrances.) Entrance lighting is important as there are as many night school students as day.
- Provide for art and accent landscape lighting to surrounding area from any renovation, remodel or new construction including, but not limited to controls of lighting and point of connection.
- Coordinate placement of fixture with landscape plan to ensure trees and brush do not conflict with lights.
- Parking lots, major walkways, pathways, stairs, and intersections should be sufficiently lit to meet safety standards. Provide adequate lighting for safety without over lighting.
- Lights must have cut-offs to cover intended area but no more. Comply with Title 24 and consider minimizing light pollution.
- State of California minimum photometric foot candles for various areas must be met.
- Upon written approval of the District, in areas where electrical power is not readily available, a solar LED fixture head may be provided. Solar panel and battery to be built into the head.

Approved Manufacturers:

Interior Lighting

- Recessed 2' x 4' LED Troffer
  - Manufacturer: Lithonia Lighting
  - Model: 2VTL

Exterior Lighting

- Building Overhangs (Entries)
  - Manufacturer: Alumen8e
  - Model: E-CF-LED
  - Surface mount, vandal resistant
- Parking Lot Lighting

- Manufacturer: McGraw-Edison
- Model: 20’ pole with double and single LED luminaire - GLEON.
- Color: AP Gray

- Parking Lots Vallejo Center
  - Manufacturer: RAB
  - Model: Tapered pole with LED luminaire – ALED5T52N
  - Color:
- Pedestrian Walkway
  - Manufacturer: RAB
  - Model: 15’ tapered pole, with luminaire - ALED5T52N.
  - Color: Custom Sandtext.
- Pathway LED Lighting
  - Manufacturer: Landscape Forms, Inc., Hawthorne.
  - Model: Hawthorne.
  - Color: Stormcloud.
  - Mount: Surface.
- On Property Roadway Lighting
  - Manufacturer: GE Lighting Solutions
  - Model: Evolve LED Roadway Lighting – ERX1 (without photo sensor)
  - Color: Gray
- Site Light Poles LED Solar Head (if approved by District) - Manufacturer: RemPhos, - Model: 1166022 or 1166027
- Finishes:
  - Verify pole and fixture colors with District. Finishes shall be highly durable.

Substitutions Allowed

- No substitutions allowed on parking lot, pedestrian and pathway, and roadway lighting fixtures

Associated Design Standards and Specifications:

- 26 05 19 – Wires, Cables and Connectors
- 26 05 48 – Supporting Devices

STANDARD DETAILS FOR SITE CONSTRUCTION

CSW | ST2

TITLE	DWG. NO.
STREETS AND HARDSCAPES	
CONCRETE CURB	100
CURB AND GUTTER	105
PEDESTRIAN SIDEWALK	110
CONCRETE VEHICULAR PAVEMENT	115
CONCRETE VALLEY GUTTER	120
DRIVEWAY APPROACH	125
ASPHALT PAVEMENT CONFORM	130
ASPHALT PAVEMENT EDGE DETAIL	135
ASPHALT PAVEMENT REPAIR DETAIL	140
SANITARY SEWER AND STORM DRAINAGE	
UTILITY TRENCH DETAIL	200
SEWER CLEANOUT	205
SEWER SERVICE LATERAL	210
SEWER MANHOLE	215
SIDEWALK UNDERDRAIN	220
STORM DRAIN MANHOLE	225
CATCH BASIN - TYPE 1	230
CATCH BASIN - TYPE 2	235
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WATER	
HYDRANT DETAIL	300
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HORIZONTAL THRUST BLOCKS	335
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TITLE	DWG. NO.
ELECTRICAL	
MAST ARM ASSEMBLIES	400
CAST IN PLACE LIGHTING FOUNDATION	405
IDENTIFICATION OF STREET LIGHT LUMINAIRES	410
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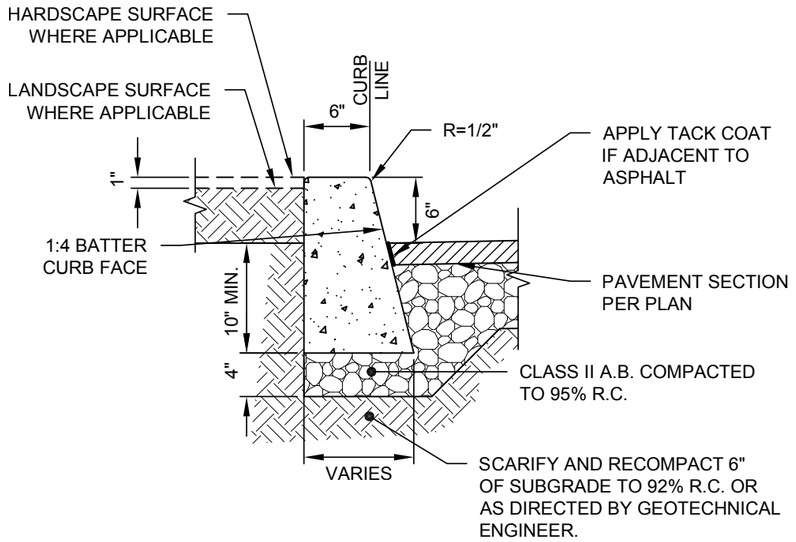
CHAIN LINK FENCE	500

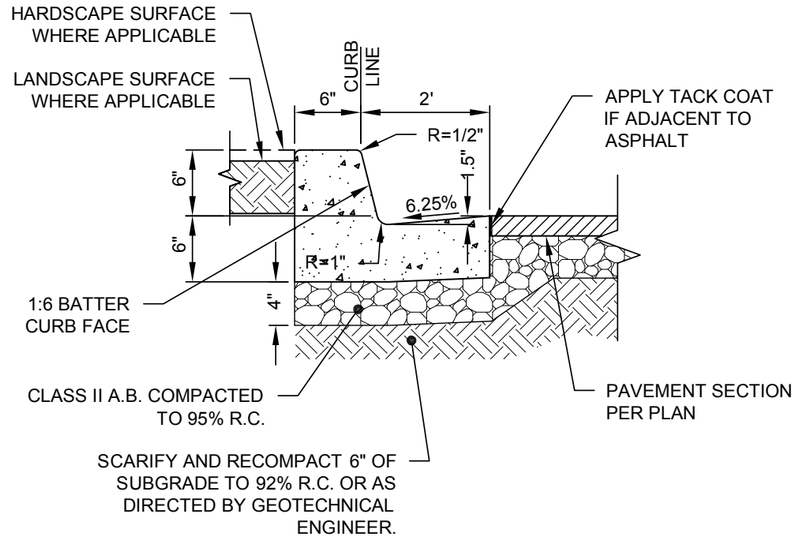
Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	TABLE OF CONTENTS	
					DWG. NO. 005	January 2014



NOTES:

1. WHERE CONCRETE WALK IS ADJACENT TO CURB, PROVIDE ISOLATION JOINT BETWEEN WALK AND BACK OF CURB.
2. CONTROL JOINTS CONSISTING OF 1" DEEP SCORES SHALL BE PLACED AT 10' INTERVALS O.C. - ALL SIDES EXCEPT BOTTOM.
3. WHERE WALK IS ADJACENT TO CURB, THE JOINTS SHALL ALIGN WITH THE JOINTS IN THE CURB.

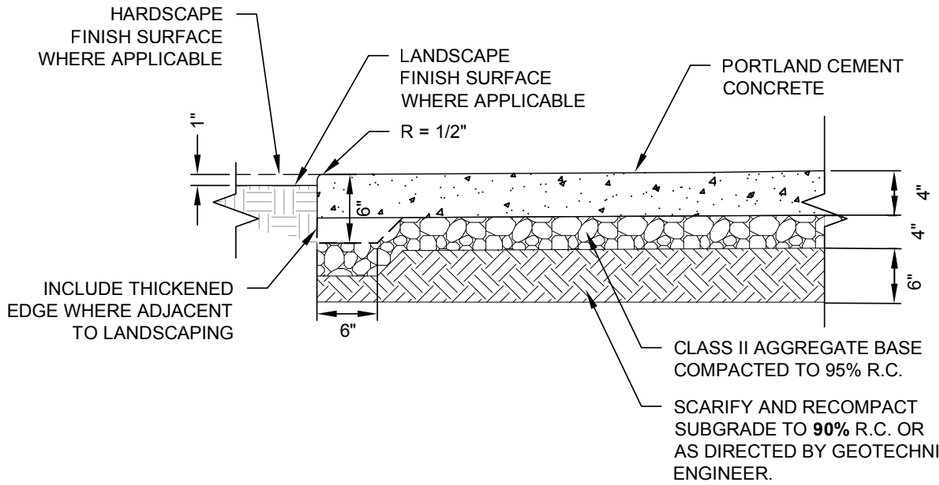
Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	CONCRETE CURB
			DWG. NO. 100	January 2014



NOTES:

1. WHERE CONCRETE WALK IS ADJACENT TO CURB, PROVIDE ISOLATION JOINT BETWEEN WALK AND BACK OF CURB.
2. CONTROL JOINTS CONSISTING OF 1" DEEP SCORES SHALL BE PLACED AT 10' INTERVALS O.C. - ALL SIDES EXCEPT BOTTOM.
3. WHERE WALK IS ADJACENT TO CURB, THE JOINTS SHALL ALIGN WITH THE JOINTS IN THE CURB.

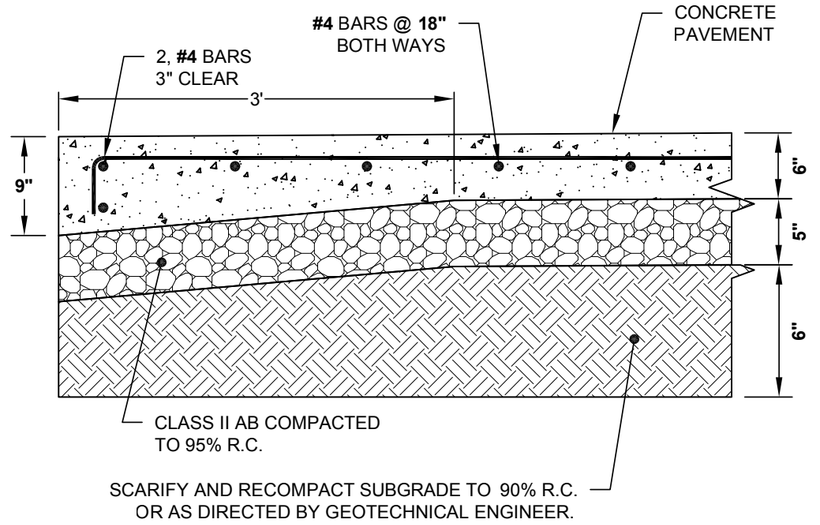
Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	CONCRETE CURB AND GUTTER
			DWG. NO. 105	January 2014



NOTES:

1. ALL TREAD SURFACES SHALL BE SLIP RESISTANT.
2. REFER TO PROJECT CONSTRUCTION DRAWINGS/ SPECIFICATIONS FOR COLOR, PATTERN, TEXTURE , FINISH, AND LOCATION OF JOINTS.
3. REFER TO GEOTECHNICAL REPORT FOR SUBGRADE PREPARATION.

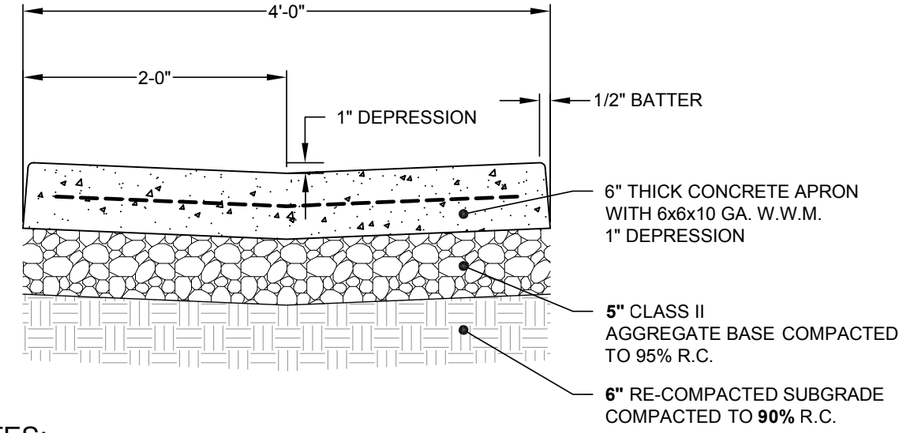
Rev.	Date			
CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	CONCRETE PEDESTRIAN WALKWAY	DWG. NO. 110 | January 2014



NOTES:

1. PAVEMENT SECTION SHOWN ABOVE ARE MINIMUM VALUES. REFER TO PROJECT GEOTECHNICAL REPORT FOR ACTUAL VALUES.
2. REFER TO ARCHITECTURAL PLANS FOR CONCRETE COLOR, PATTERN, TEXTURE AND FINISH.
3. SEE PROJECT CONSTRUCTION DOCUMENTS FOR DETAILS AND LOCATIONS OF CONTROL JOINTS AND EXPANSION JOINTS.
4. REFER TO GEOTECHNICAL REPORT FOR SUBGRADE PREPARATION.
5. CONCRETE COMPRESSIVE STRENGTH TO BE 4 000 PSI OR GREATER.

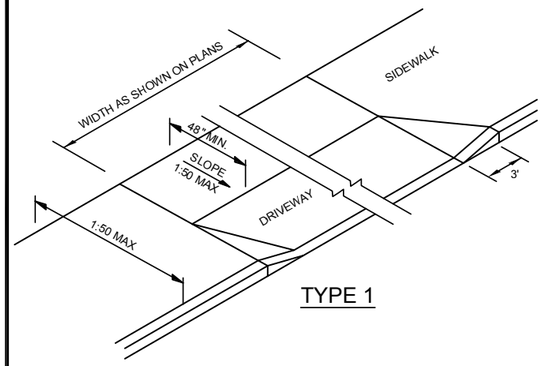
Rev.	Date			
CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	CONCRETE VEHICULAR PAVEMENT	DWG. NO. 115 | January 2014



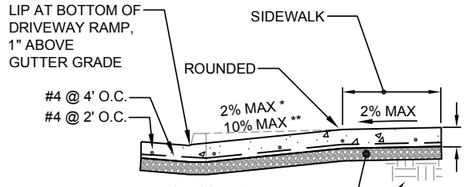
NOTES:

1. CONCRETE SHALL BE CLASS "B" (5 SACK) WITH 1" AGGREGATE.
2. NO CONCRETE SHALL BE PLACED PRIOR TO FORM INSPECTION .
3. ASPHALT CONCRETE SHALL BE 1/4" HIGH AT EDGE OF CONCRETE.
4. CONTROL JOINTS SHALL BE PLACED AT 8' INTERVALS.
5. EXPANSION JOINTS SHALL BE PLACED AT 16' INTERVALS.

Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	CONCRETE VALLEY GUTTER DWG. NO. 120 — January 2014

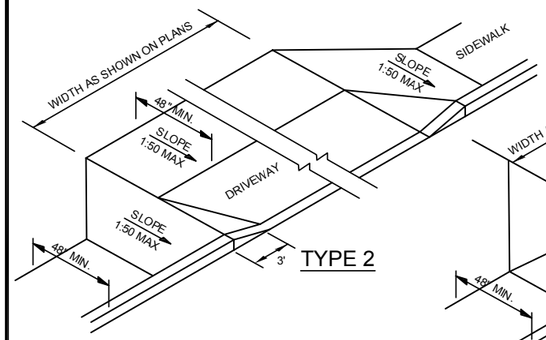


TYPE 1



* TYPE 3 DRIVEWAY
** TYPE 1 and 2 DRIVEWAY

SECTION VIEW



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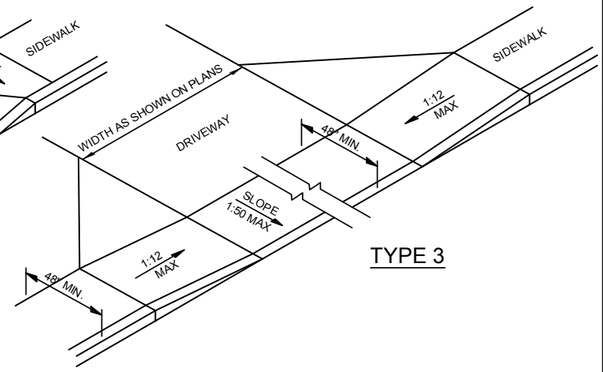
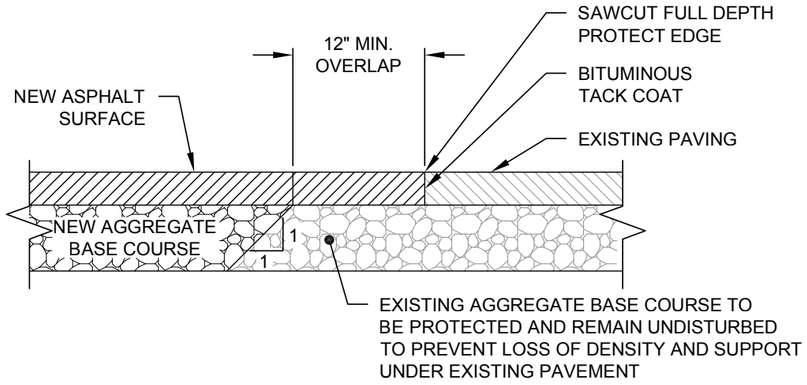


TYPE 3

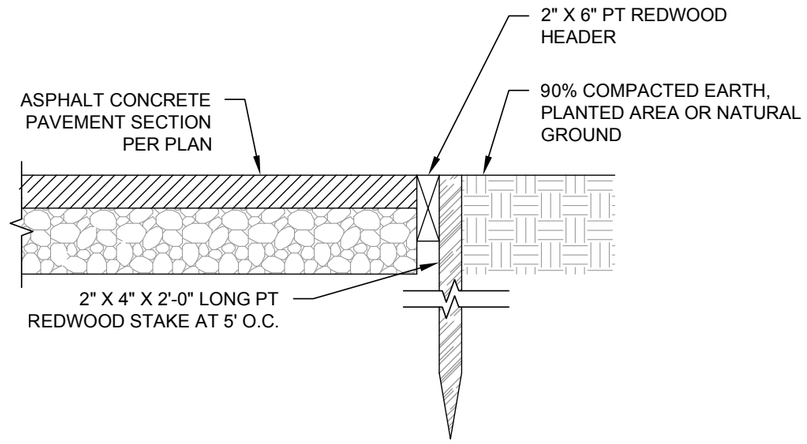
Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	DRIVEWAY APPROACH DWG. NO. 125 — January 2014



NOTE:

1. REFER TO PROJECT CONSTRUCTION DOCUMENTS FOR ASPHALT PAVEMENT SECTION , SUBGRADE PREPARATION AND OTHER REQUIREMENTS.

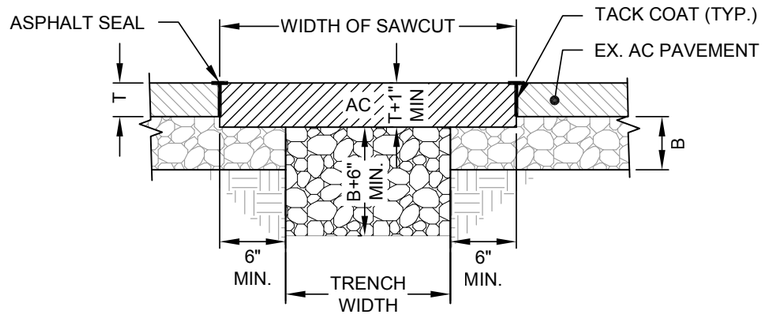
Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	ASPHALT PAVEMENT CONFORM DWG. NO. 130 — January 2014



NOTE:

1. REFER TO PROJECT CONSTRUCTION DOCUMENTS FOR ASPHALT PAVEMENT SECTION , SUBGRADE PREPARATION AND OTHER REQUIREMENTS.

Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	ASPHALT PAVEMENT EDGE DETAIL DWG. NO. 135 — January 2014



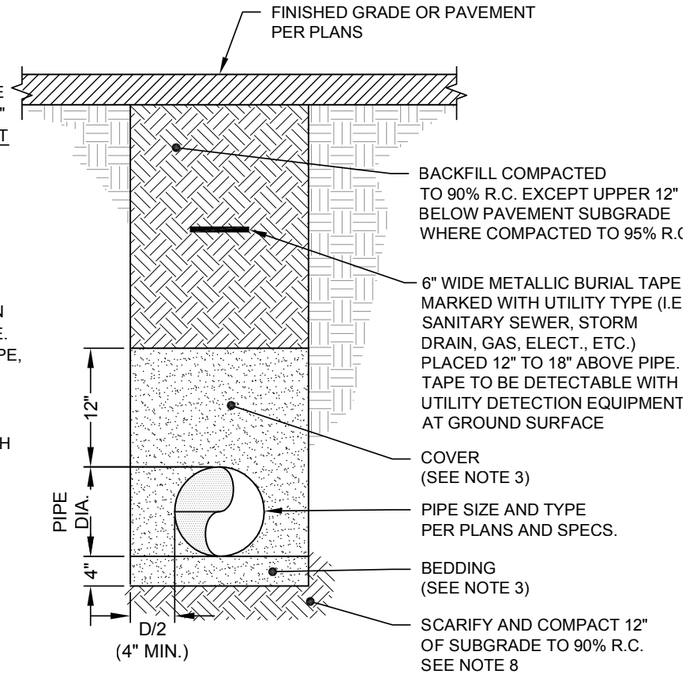
NOTES:

1. DURING EXCAVATION AND SUBGRADE PREPARATION, THE CONTRACTOR SHALL TAKE ALL NECESSARY STEPS TO ENSURE THE PROTECTION OF ALL IMPROVEMENTS, WHETHER PUBLIC OR PRIVATE, INCLUDING UTILITIES AND THEIR SERVICES FROM ANY DAMAGE THAT COULD OCCUR DUE TO CONTRACTORS CONSTRUCTION ACTIVITY.
2. IF NOT OTHERWISE SPECIFIED, TRENCH BACKFILL SHALL BE DENSIFIED TO A MINIMUM OF 90% R.C.
3. TEMPORARY PAVEMENT RESURFACING SHALL BE PLACED AT THE CONTRACTORS EXPENSE. IT SHALL BE PLACED LEVEL WITH THE EXISTING PAVEMENT ON COMPACTED TRENCH BACKFILL AND SHALL BE A MINIMUM OF 2" THICK.
4. PERMANENT PAVEMENT RESURFACING SHALL BE DONE WITHIN TWO (2) WEEKS AFTER BACKFILL OF TRENCHES HAS BEEN COMPLETED, ONLY AFTER SETTLEMENT HAS TAKEN PLACE AND THE FILL SURFACE HAS SUFFICIENTLY DRIED. ALL CUTS SHALL BE GROOMED CLEAN AND STRAIGHT.
5. CONTACT SURFACES OF EXISTING PAVEMENT MANHOLE FRAMES AND SHAFTS AND CONCRETE SURFACES SHALL HAVE A TACK COATING APPLIED BEFORE PERMANENT ASPHALT RESURFACING IS PLACED.
6. ASPHALT CONCRETE PAVEMENT SHALL BE AS SPECIFIED.

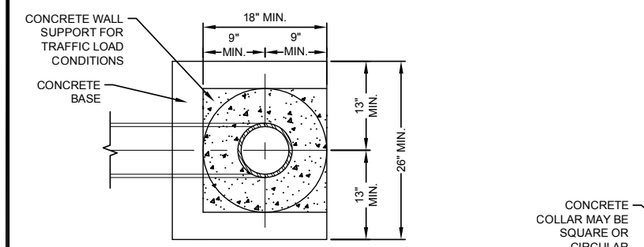
Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS
				ASPHALT PAVEMENT REPAIR at UTILITY TRENCH
				DWG. NO. 140 — January 2014

NOTES:

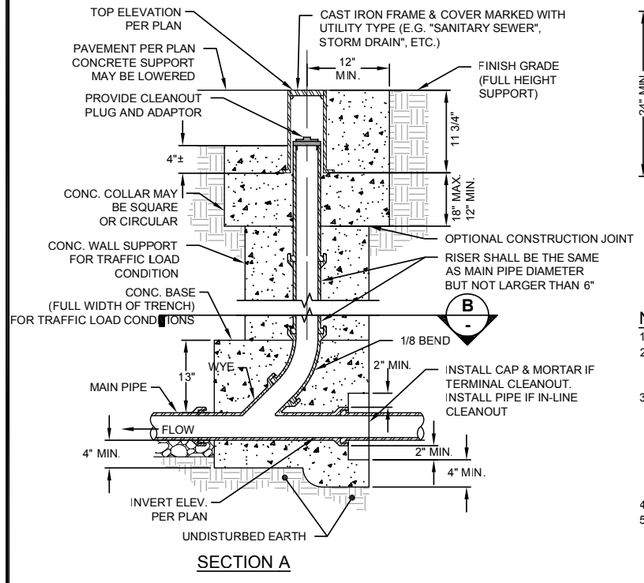
1. UTILITY TRENCH CONSTRUCTION SHALL CONFORM TO THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT.
2. EXCAVATE FOR BELLS OR HUBS SO FULL LOAD IS CARRIED BY PIPE BARRELS.
3. BEDDING AND COVER: SAND OR FINE GRAVEL WITH LESS THAN 10% FINES.
4. BEDDING SHALL BE PLACED IN A MANNER SUCH AS SLICING, SHOVEL-SPADING, OR SHOVEL RODDING TO ENSURE COMPLETE FILLING OF THE "HAUNCH AREAS" BELOW THE PIPE. JETTING IS NOT PERMITTED
5. SUBGRADE TO BE FREE OF PROTRUDING OBJECTS.
6. BACKFILL MAY BE NATIVE SOIL THAT MEETS THE CRITERIA FOR FILL AS DESCRIBED IN THE GEOTECHNICAL REPORT.
7. WHERE LESS THAN 18" BETWEEN BOTTOM OF PAVING SECTION (I.E. BOTTOM OF A.B.) AND TOP OF PIPE, BACKFILL TO BE CONTROLLED DENSITY FILL (CDF)
8. TRENCH SUBGRADE SHALL BE PREPARED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT.



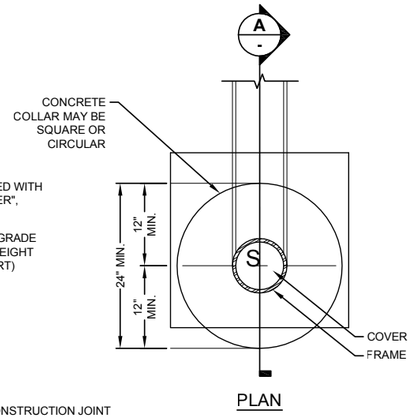
Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS
				UTILITY TRENCH
				DWG. NO. 200 — January 2014



SECTION B



SECTION A



PLAN

NOTES:

1. SEE PROJECT PLANS FOR INVERT ELEVATION.
2. PIPE AND FITTINGS, EXCEPT AS OTHERWISE SHOWN HEREON SHALL BE OF THE SAME MATERIAL AS THE SEWER, UNLESS APPROVED ADAPTERS ARE UTILIZED.
3. PIPE AND FITTINGS SHALL BE PROPERLY ALIGNED AND MAINTAINED WHILE CONCRETE IS BEING PLACED AND ALLOWED TO HARDEN. JOINTS FOR PIPES AND FITTINGS SHALL BE MADE PRIOR TO PLACING CONCRETE. CONCRETE FOR BEDDING, ENCASEMENT, AND FITTINGS SHALL BE PLACED UNIFORMLY AROUND THE PIPE AND FITTINGS AS SHOWN HEREON TO MAINTAIN PROPER ALIGNMENT.
4. THE ACCESS FRAME, COVER AND CAP SHALL BE CAST IRON.
5. THE CONTRACTOR, AT HIS OPTION, MAY PLACE EITHER CIRCULAR OR SQUARE CONCRETE PIPE WALL SUPPORTS AS SHOWN HEREON.

Rev.	Date

CSW | ST2 ENGINEERING GROUP

SOLANO COMMUNITY COLLEGE

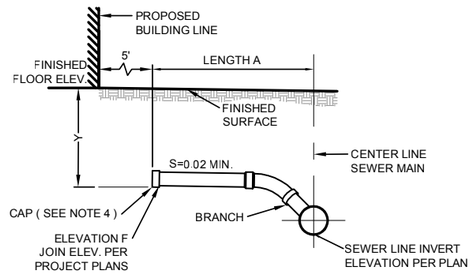
SOLANO COMMUNITY COLLEGE DISTRICT

STANDARD DETAILS

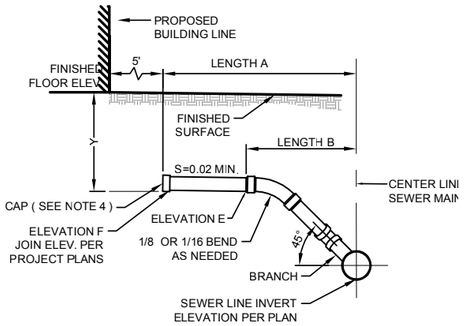
SEWER CLEANOUT

DWG. NO. 205

January 2014



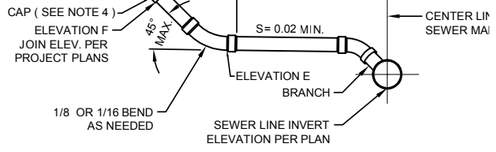
PROFILE
TYPE A



PROFILE
TYPE B

NOTES:

1. EXCEPT AS OTHERWISE INDICATED ON THE PROJECT PLANS, ALL SEWERS SHALL BE TYPE "A" AND SHALL BE CONSTRUCTED ON STRAIGHT LINES AND GRADES BETWEEN CONTROL POINTS AND ELEVATIONS.
2. DIMENSIONS:
   Y = VARIES - JOIN ELEVATION PER PROJECT PLANS
   LENGTHS "A" AND "B" - SEE PROJECT PLANS
   ELEVATION "E" - SEE PROJECT PLANS
   ELEVATION "F" - SEE PROJECT PLANS
3. ALL CONNECTION SEWER PIPE SHALL BE 6 INCH UNLESS OTHERWISE INDICATED.
4. IF NOT CONNECTED TO BUILDING SEWER AT TIME OF INSTALLATION, THE UPPER END OF THE SEWER CONNECTION SHALL BE SEALED BY INSTALLING A CAP AND SEALING THE CAP WITH 1" THICK TYPE "F" MORTAR AROUND THE CIRCUMFERENCE OF THE CAP. THE SEAL SHALL BE REMOVED PRIOR TO CONNECTION WITH BUILDING SEWER.
5. EXCEPT AS CONTROLLED BY ELEVATIONS INDICATED ON THE PROJECT PLANS, THE MINIMUM SLOPE FOR ALL PIPES SHALL BE 2.0 PERCENT (S=0.020 MIN.).
6. BRANCHES SHALL BE EITHER TEES OR WYES AND SHALL BE ROTATED UPWARD FROM THE HORIZONTAL TO AN ANGLE OF 22-1/2 DEGRESS TO 45 DEGRESS WHEN TEES ARE USED. BENDS ARE NOT REQUIRED BUT MAY BE USED AT THE OPTION OF THE CONTRACTOR. WHEN THE BRANCH ROTATION DOES NOT CONFORM THE THE SLOPE OF THE BUILDING CONNECTION SEWER, PULLED JOINTS MAY BE USED FOR ADJUSTMENT.
7. CONNECTION OF A BUILDING SEWER SMALLER THAN 6 INCHES TO A 6 INCH CONNECTION SEWER SHALL BE MADE USING AN APPROVED INCREASER - TEE OR AN INCREASER FOLLOWED BY A TEE.



PROFILE
TYPE C

Rev.	Date

CSW | ST2 ENGINEERING GROUP

SOLANO COMMUNITY COLLEGE

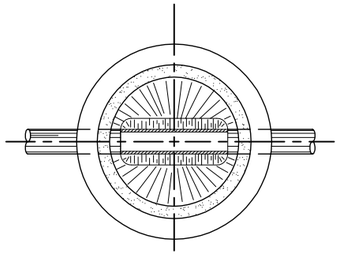
SOLANO COMMUNITY COLLEGE DISTRICT

STANDARD DETAILS

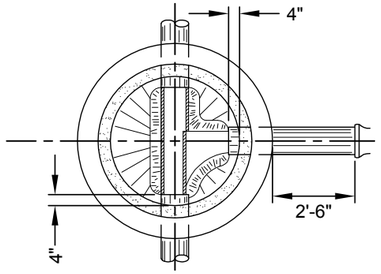
SEWER SERVICE

DWG. NO. 210

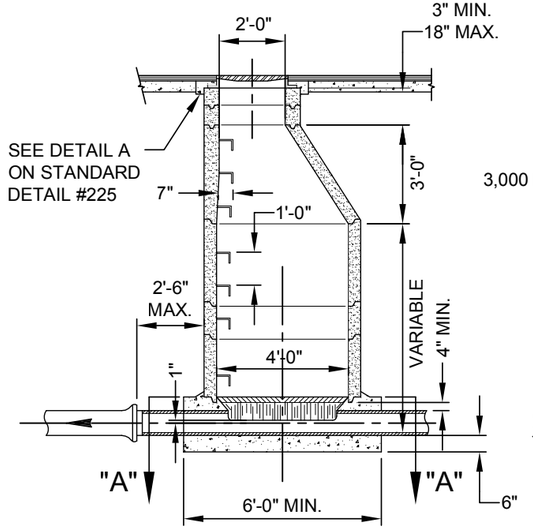
January 2014



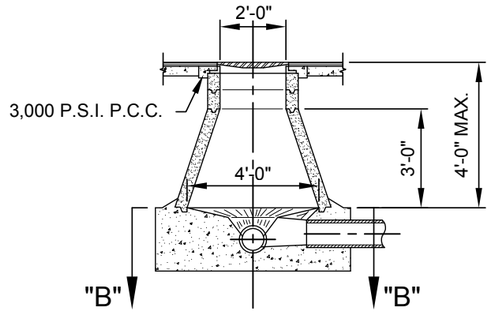
SECTION "A-A"



SECTION "B-B"



SEWER MANHOLE

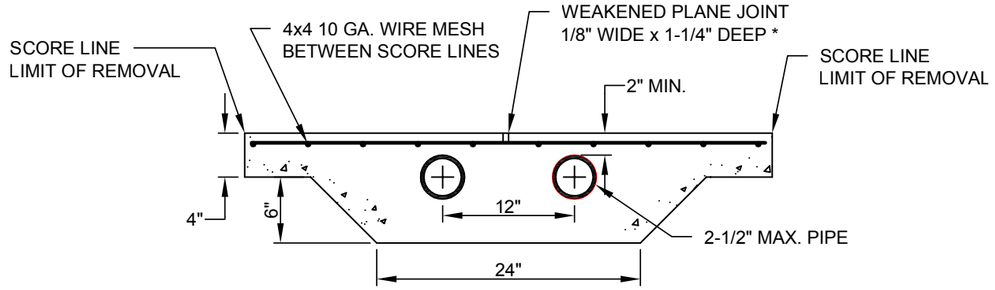


SHALLOW SEWER MANHOLE

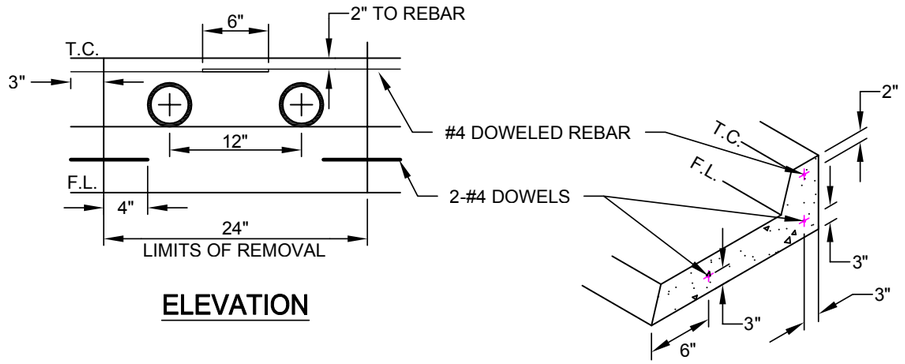
NOTES:

1. MANHOLE FRAME AND COVER SHALL BE PINKERTON A-640, D & LA-1024 OR APPROVED EQUAL MARKED "SANITARY SEWER".
2. POURED CONCRETE BASE SHALL BE 4,000 PSI OR APPROVED PRECAST BASE.
3. ALL JOINTS SHALL BE SEALED WITH APPROVED FLEXIBLE JOINT SEALANT.
4. PLACE STEPS ON DOWNSTREAM SIDE OF MANHOLE.
5. LATERALS INTO MANHOLES SHALL HAVE A JOINT AT 2'-6" FROM OUTSIDE WALL.

Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	SEWER MANHOLE DWG. NO. 215	January 2014



SIDE WALKS



ELEVATION

CURB & GUTTER

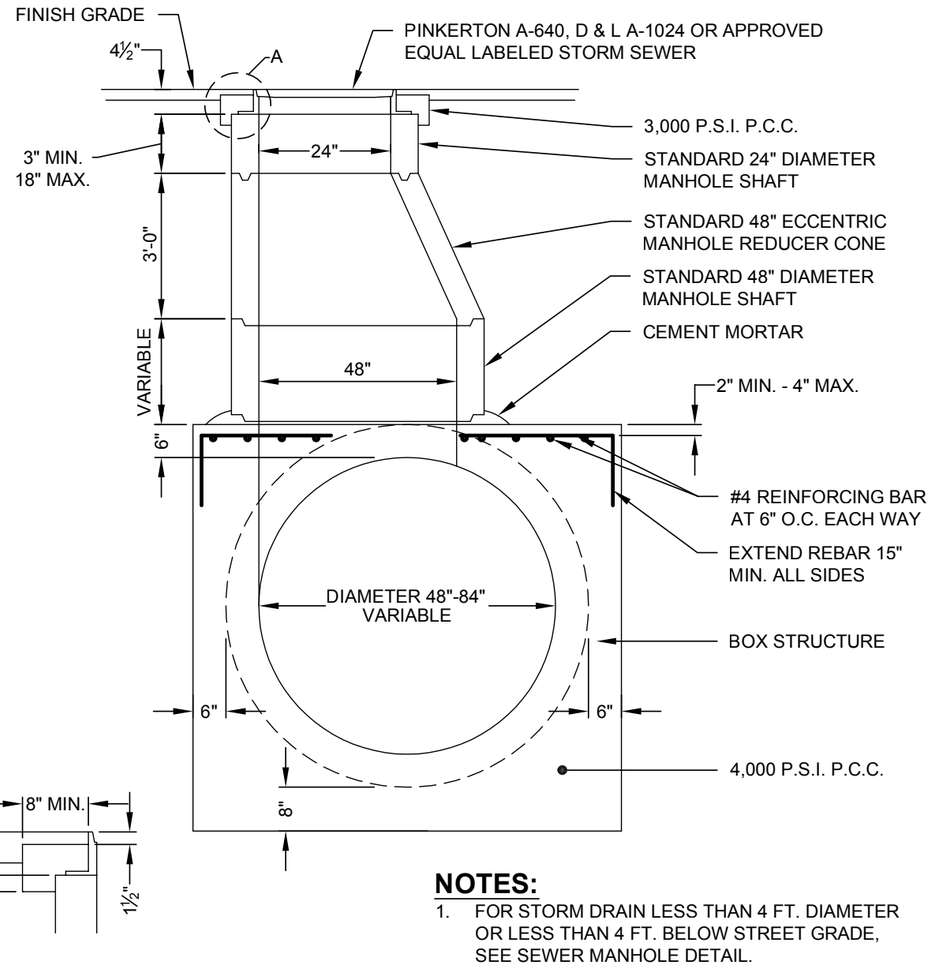
NOTES:

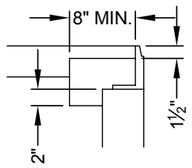
1. OWNER SHALL BE RESPONSIBLE FOR CLEANING AND MAINTAINING PIPE.
2. MINIMUM CROSS-SLOPE TO BE 1% FOR DRAIN PIPE.
3. PLACE 4X4 WIRE MESH FULL LENGTH 24" ON EACH SIDE OF PIPE.
4. UNDER SIDEWALK DRAINS TO BE USED ONLY BY APPROVAL OF CITY ENGINEER WHERE A STORM DRAIN DOSE NOT EXIST, OR EXTENSION OF AN EXISTING STORM DRAIN IS IMPRACTICAL.

* WEAKENED PLANE JOINT TO BE LOCATED MIDWAY BETWEEN OUTSIDE PIPES.

Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	COMMERCIAL MULTIPLE UNDER SIDEWALK DRAINS DWG. NO. 220	January 2014

STORM DRAIN MANHOLE
(CAST-IN-PLACE PIPE)



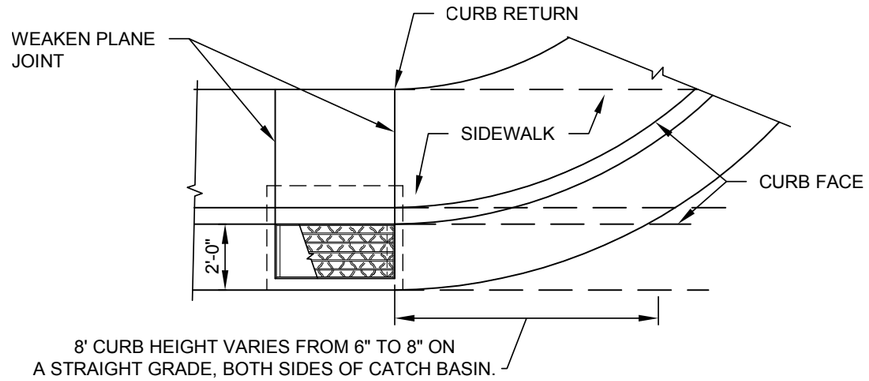


DETAIL A

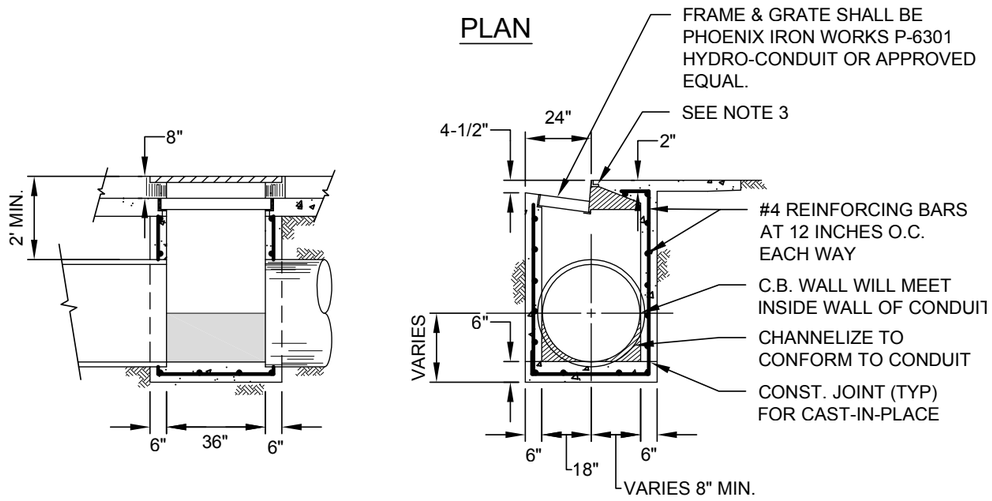
NOTES:

1. FOR STORM DRAIN LESS THAN 4 FT. DIAMETER OR LESS THAN 4 FT. BELOW STREET GRADE, SEE SEWER MANHOLE DETAIL.
2. CONSTRUCT MANHOLE WITHOUT DROP STEPS.
3. GROUT ALL JOINTS.

Rev.	Date			
CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	STORM DRAIN MANHOLE	
			DWG. NO. 225	January 2014



PLAN

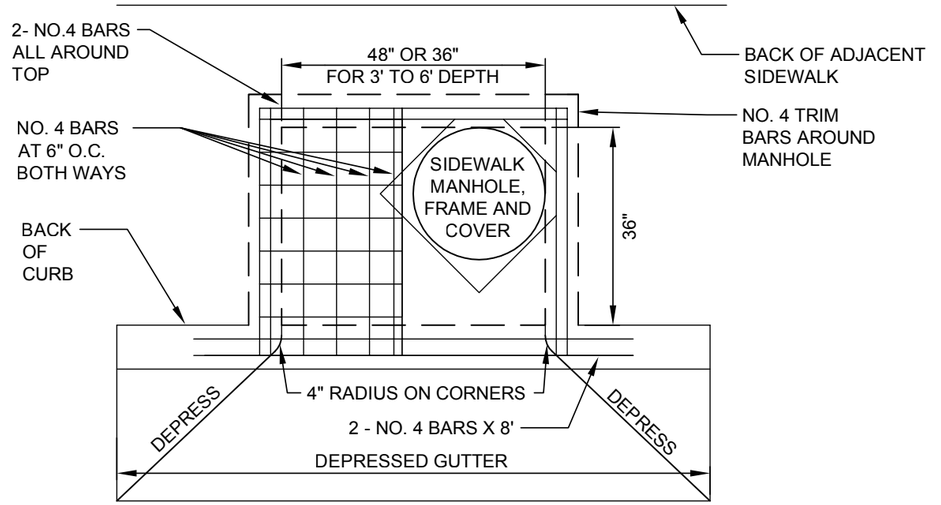


CROSS SECTIONAL VIEWS

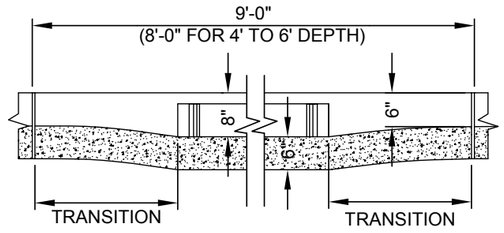
NOTES:

1. CONCRETE FOR STRUCTURE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3,000 P.S.I.
2. ALL STRUCTURES SHALL BE GROUTED AND SACKED.
3. NOSING SHALL BE 2 1/2"X2 1/2"X1/4"X4' GALVANIZED ANGLE WITH THREE 6" TIE BARS.
4. FOR STORM DRAIN PIPES LARGER THAN 36", USE STORM DRAIN MANHOLE DETAIL FOR BOX STRUCTURE.

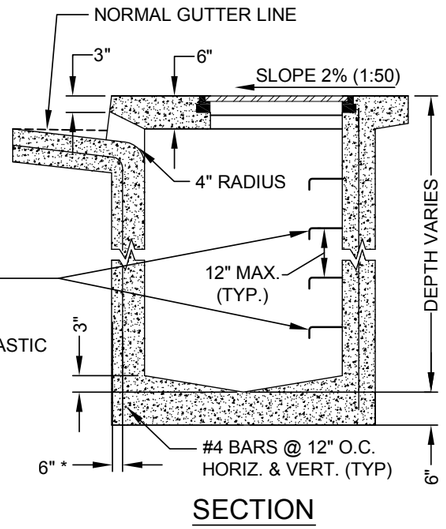
Rev.	Date			
CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	CATCH BASIN TYPE 1	
			DWG. NO. 230	January 2014



PLAN



GUTTER ELEVATION



SECTION

NOTES:

1. SEE STANDARD DETAIL #240 FOR GENERAL NOTES.
2. TOP SHALL BE CAST IN PLACE.
3. ADJACENT SIDEWALK SHALL BE POURED MONOLITHIC WITH TOP.

* 8" WALL FOR DEPTHS GREATER THAN 8'

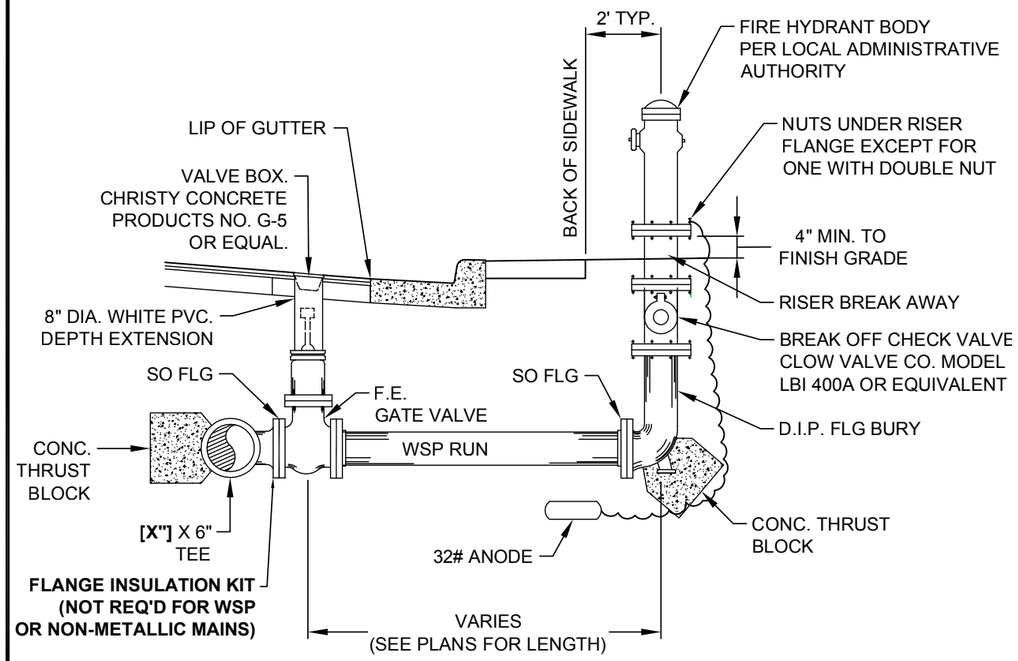
Rev.	Date			
		CSW ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	CATCH BASIN TYPE 2
			DWG. NO. 235	January 2014

NOTES:

1. CONCRETE SHALL BE CLASS "A" (6 SACK MIX) UNLESS OTHERWISE NOTED. STRUCTURE TOPS CAST WITH ADJACENT CURB/SIDEWALK MAY BE CLASS "B" CONCRETE.
2. BASE SHALL BE PLACED AGAINST UNDISTURBED EARTH, SIDES MAY BE FORMED OR PLACED AGAINST UNDISTURBED EARTH.
3. WHERE CONDUITS ARE ENCOUNTERED THAT ARE LARGER IN DIAMETER THAN THE WIDTH OF THE WALL THROUGH WHICH THEY PASS, THE INSIDE DIMENSION OF THE WALLS PERPENDICULAR TO THE DIRECTION OF THE PIPE SHALL BE INCREASED TO 12" WIDER THAN THE OUTSIDE DIAMETER OF THE PIPE.
4. EXPANSION JOINTS SHALL BE PLACED THROUGH CURB AND SIDEWALK AT BOTH SIDES OF CATCH BASINS AND SHALL BE LIMIT OF PAYMENT FOR CURB AND GUTTER. UNIT PRICES FOR DRAINAGE STRUCTURES SHALL INCLUDE CURB, GUTTER AND SIDEWALK POURED WITH DRAINAGE STRUCTURE.
5. NO CONCRETE SHALL BE PLACED PRIOR TO FORM AND STEEL APPROVAL BY THE AGENCY ENGINEER.
6. WALL THICKNESS, REINFORCING, AND STEP (AS REQUIRED BY AGENCY ENGINEER) REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE TABLE BELOW, UNLESS OTHERWISE INDICATED BY THE PROJECT PLANS OR DIRECTED BY THE AGENCY ENGINEER.
7. PLACE 2" WEEPHOLES AS REQUIRED BY THE AGENCY ENGINEER.
8. EQUIVALENT PRECAST STRUCTURES MAY BE SUBSTITUTED AS APPROVED BY THE AGENCY ENGINEER.
9. WALL THICKNESS SHALL NOT EXCEED 10" ON ANY STRUCTURE.
10. PRECAST INLETS AND MANHOLES SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS AND BE DESIGNED TO WITHSTAND H-20 LOADING.
11. PROVIDE FOR SECURITY FASTENERS FOR MANHOLE COVER.

DEPTH	WALL THICKNESS (SEE NOTE #11)	WALL REINFORCEMENT	STEPS REQUIRED
LESS THAN 3'	6"	NO. 4 AT 12" BOTH WAYS	NO
LESS THAN 3'	8"	NONE OUTSIDE ROADWAY. NO. 4 AT 12" BOTH WAYS WITHIN OR ADJACENT TO ROAD.	NO
3' TO 8'	6"	NO. 4 AT 12" BOTH WAYS	AS REQUIRED BY THE AGENCY ENGINEER
OVER 8'	8"	NO. 4 AT 12" BOTH WAYS	AS REQUIRED BY THE AGENCY ENGINEER

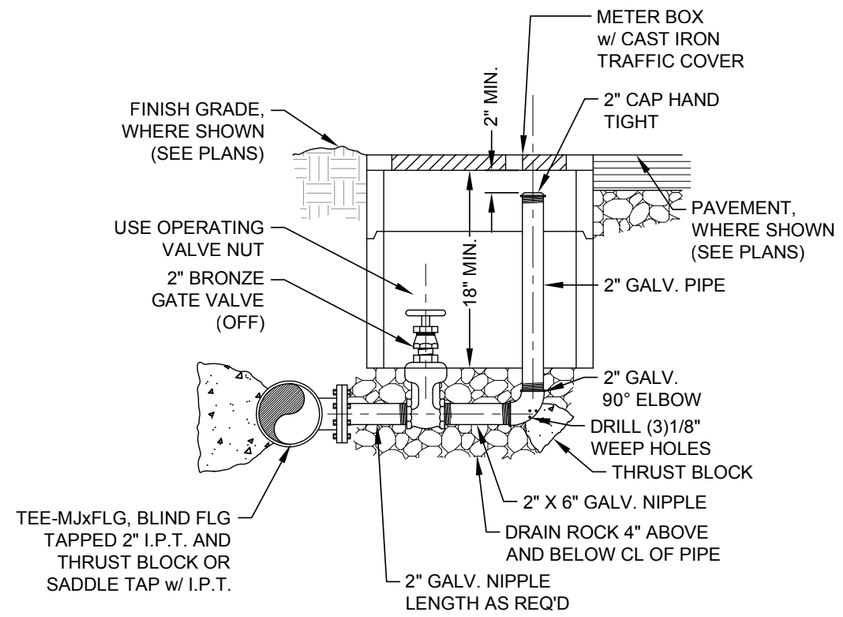
Rev.	Date			
		CSW ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	CATCH BASIN TYPE 2 NOTES
			DWG. NO. 240	January 2014



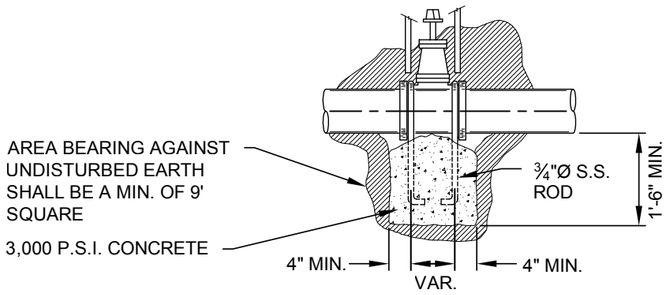
NOTES:

1. HYDRANT LOCATION IN RELATION TO THE CURB AND SIDEWALK MUST BE DETERMINED BY THE CONTROLLING FIRE MARSHALL.
2. PRIME AND WRAP ALL BARE METAL INCLUDING HYDRANT BURY AND RISER UP TO BOTTOM OF HYDRANT FLANGES.
3. FIRE HYDRANT SHALL BE INSTALLED PER LOCAL FIRE DEPARTMENT REQUIREMENTS.

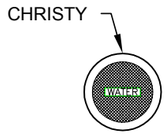
Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	FIRE HYDRANT
			DWG. NO. 300	January 2014



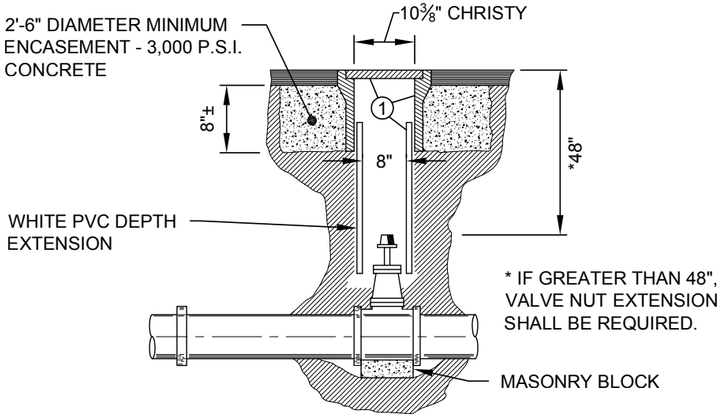
Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	BLOW OFF
			DWG. NO. 305	January 2014



TYPICAL SECTION
GREATER THAN 12" VALVE



VALVE BOX
AND COVER

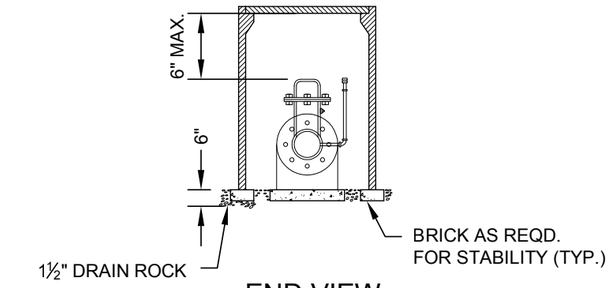


TYPICAL SECTION
12" VALVE AND SMALLER

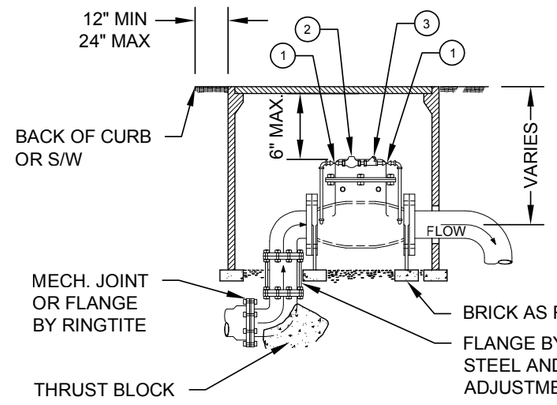
NOTES:

1. VALVE BOX AND COVER SHALL BE CHRISTY CONCRETE PRODUCTS NO. G-5 OR EQUAL, WITH DEPTH EXTENSIONS AS REQUIRED.
2. ALL VALVES SHALL HAVE FLANGED CONNECTIONS AT ALL TEES AND CROSSES.
3. ALL VALVES SHALL BE SEPARATED FROM JOINTS WITH A 3' TO 6' SECTION OF PIPE.
4. VALVE SHALL BE RESILIENT SEAT GATE (12" OR LESS) OR BUTTERFLY (GREATER THAN 12") PER CITY SPECIFICATION.

Rev.	Date			
CSW | ST2 ENGINEERING GROUP		SOLANO COMMUNITY COLLEGE	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	VALVE INSTALLATION
			DWG. NO. 310	January 2014



END VIEW



KEYNOTES

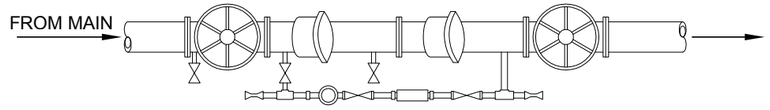
1. THREADED CURB STOP VALVE
2. ROCKWELL METER
3. FORD HS-11 CHECK VALVE TO MATCH METER SIZE OR EQUAL.

DETECTOR CHECK UNIT

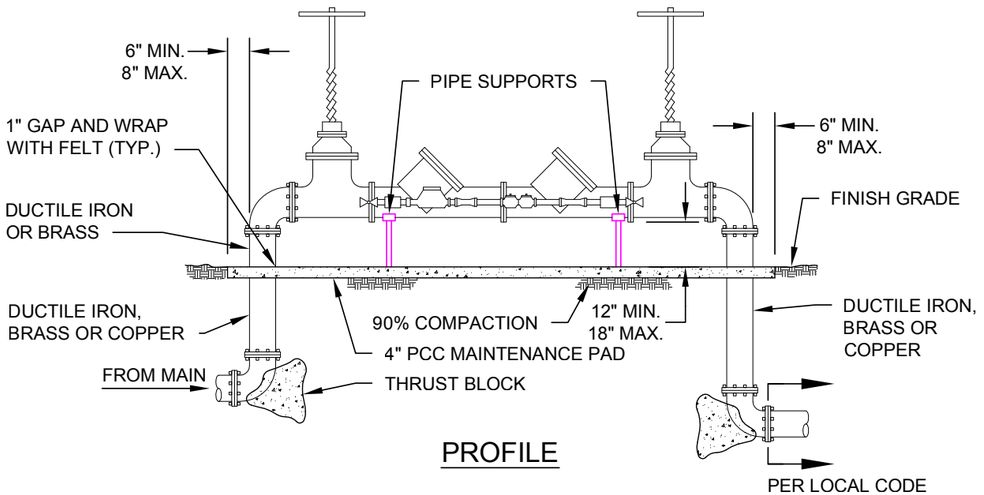
NOTES:

1. BYPASS METER SHALL BE A SENSUS. FOR 4" AND 6" VALVES USE 3/4" SR METER. FOR 8" VALVES USE 1" SR METER FOR 10" VALVES USE 1-1/2" SR METER. METERS SHALL READ IN CUBIC FEET.
2. VAULT BOX TO BE APPROVED BY THE CITY ENGINEER.
3. DETECTOR CHECK VALVE SHALL HAVE AN INTEGRAL BY-PASS AND WEIGHTED CLAPPER AND BELL & FM LISTED.
4. READING LID TO BE INSTALLED OVER METER.
5. FIRE SERVICE LINE MATERIALS AND INSTALLATION FROM THE WATER MAIN SHALL CONFORM TO STANDARD DETAIL FOR 3" AND LARGER WATER SERVICE INSTALLATION.
6. DETECTOR CHECK VALVE EXTERIOR FINISH SHALL BE HOT DIPPED GALVANIZED OR PAINTED RED.
7. ALL PIPES AND FITTINGS FROM MECHANICAL JOINT TO DETECTOR CHECK SHALL BE DUCTILE IRON. BYPASS SHALL BE COPPER OR BRASS.

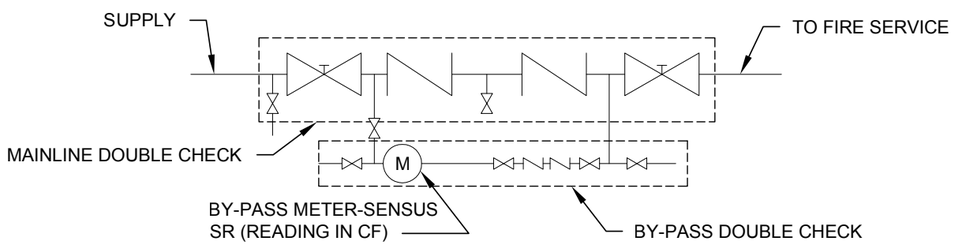
Rev.	Date			
CSW | ST2 ENGINEERING GROUP		SOLANO COMMUNITY COLLEGE	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	DETECTOR CHECK VALVE
			DWG. NO. 315	January 2014



PLAN VIEW



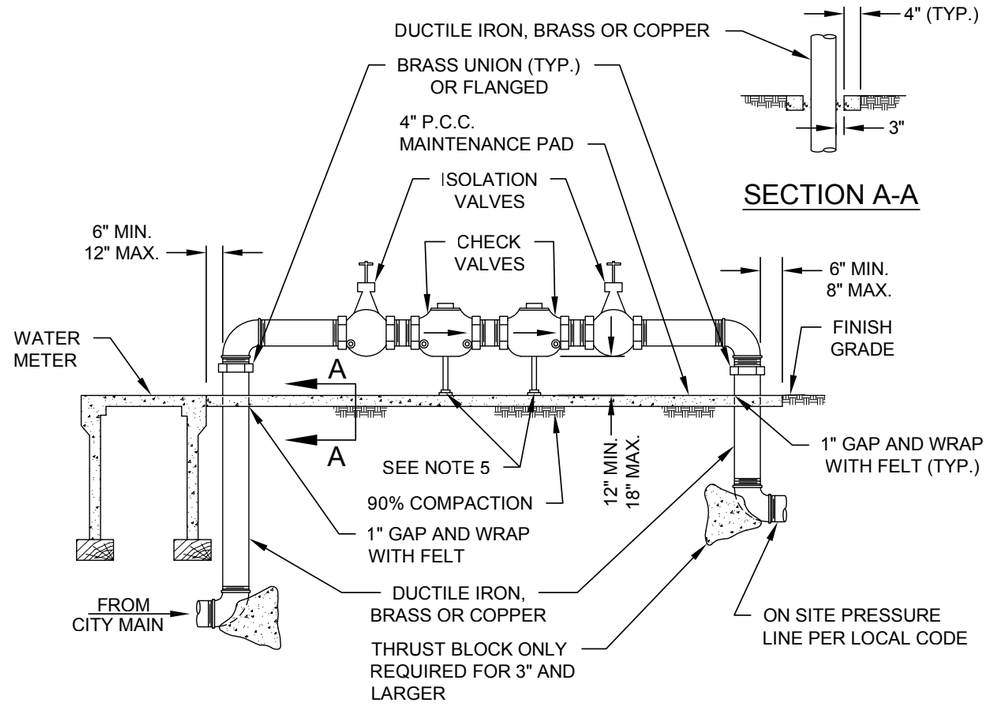
PROFILE



NOTES:

1. DOUBLE CHECK DETECTOR ASSEMBLY SHALL BE ON THE MOST RECENT LIST APPROVED BY THE CALIFORNIA DEPARTMENT OF HEALTH SERVICES. SHUTOFF VALVES SHALL BE O, S, & Y TYPE (RESILIENT SEAT GATES). UL LISTED FOR FIRELINE SERVICE.
2. THE DOUBLE CHECK DETECTOR ASSEMBLY SHALL BE DELIVERED TO THE PROJECT SITE AS A UNIT ASSEMBLED BY THE MANUFACTURER INCLUDING THE SENSUS SR BY-PASS METER.

Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	DOUBLE CHECK DETECTOR ASSEMBLY
		SOLANO COMMUNITY COLLEGE	DWG. NO. 320	January 2014

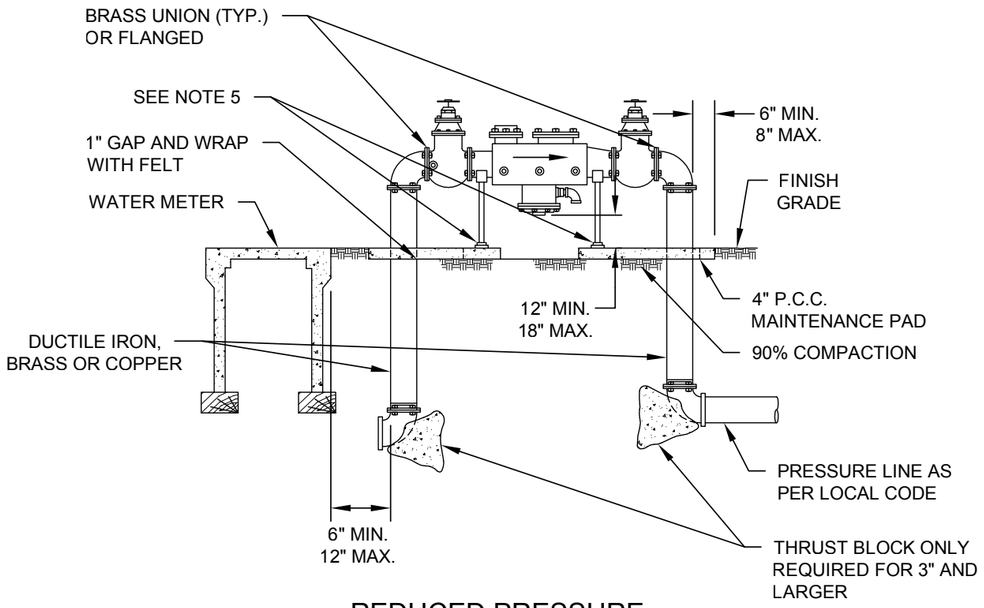


DOUBLE CHECK VALVE ASSEMBLY

NOTES:

1. ALL DOUBLE CHECK VALVE ASSEMBLIES AND REDUCED PRESSURE BACKFLOW PREVENTION DEVICES SHALL BE ON THE MOST RECENT LIST OF APPROVED BACKFLOW PREVENTION DEVICES AS PUBLISHED BY THE CALIFORNIA DEPARTMENT OF HEALTH SERVICES. VALVE ASSEMBLY SHALL BE DELIVERED TO THE PROJECT SITE AS A UNIT ASSEMBLED BY THE MANUFACTURER.
2. CITY MAY REQUIRE TWO BACKFLOW PREVENTION DEVICES ON DOMESTIC SERVICE, WITH ONE TO SERVE AS A BYPASS FOR TESTING PURPOSES, IF WATER SERVICE CAN NOT BE SHUT OFF FOR MAINTENANCE OR IF TOXIC CHEMICALS ARE INVOLVED.
3. BACKFLOW PREVENTION DEVICES SHALL BE ONLY REDUCED PRESSURE TYPES FOR ALL LANDSCAPE IRRIGATION APPLICATIONS.
4. COPPER CONNECTIONS SHALL BE COMPRESSION FITTINGS OR SILVER SOLDER (MINIMUM 15% SILVER CONTENT). ALL COPPER SHALL BE RIGID TYPE K.
5. PIPE SUPPORTS SHOULD BE USED IF THE PIPE IS 3" OR LARGER.
6. THE DIAGRAMS DEPICT DOUBLE CHECK/REDUCED PRESSURE ASSEMBLIES LARGER THAN 1 INCH. COMPONENTS SHOWN ARE FOR INFORMATION ONLY.

Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	DOUBLE CHECK VALVE
		SOLANO COMMUNITY COLLEGE	DWG. NO. 325	January 2014



REDUCED PRESSURE BACKFLOW PREVENTION DEVICE

NOTES:

1. ALL DOUBLE CHECK VALVE ASSEMBLIES AND REDUCED PRESSURE BACKFLOW PREVENTION DEVICES SHALL BE ON THE MOST RECENT LIST OF APPROVED BACKFLOW PREVENTION DEVICES AS PUBLISHED BY THE CALIFORNIA DEPARTMENT OF HEALTH SERVICES. VALVE ASSEMBLY SHALL BE DELIVERED TO THE PROJECT SITE AS A UNIT ASSEMBLED BY THE MANUFACTURER.
2. CITY MAY REQUIRE TWO BACKFLOW PREVENTION DEVICES ON DOMESTIC SERVICE, WITH ONE TO SERVE AS A BYPASS FOR TESTING PURPOSES, IF WATER SERVICE CAN NOT BE SHUT OFF FOR MAINTENANCE OR IF TOXIC CHEMICALS ARE INVOLVED.
3. BACKFLOW PREVENTION DEVICES SHALL BE ONLY REDUCED PRESSURE TYPES FOR ALL LANDSCAPE IRRIGATION APPLICATIONS.
4. COPPER CONNECTIONS SHALL BE COMPRESSION FITTINGS OR SILVER SOLDER (MINIMUM 15% SILVER CONTENT). ALL COPPER SHALL BE RIGID TYPE K.
5. PIPE SUPPORTS SHOULD BE USED IF THE PIPE IS 3" OR LARGER.
6. THE DIAGRAMS DEPICT DOUBLE CHECK/REDUCED PRESSURE ASSEMBLIES LARGER THAN 1 INCH. COMPONENTS SHOWN ARE FOR INFORMATION ONLY.

Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	REDUCED PRESSURE BACKFLOW DEVICES DWG. NO. 330 — January 2014

REQUIRED BEARING AREA TOTAL SQUARE FEET

FITTING TYPE		45° BEND	90° BEND	22-1/2° BEND	TEE OR DEAD END	TEE W/ PLUG	CROSS W/PLUG
TYPICAL INSTALLATION							
PIPE SIZE	4"	1	2	1	2	2	2
	6"	2	4	1	3	4	4
	8"	5	8	3	6	8	8
	10"	7	14	4	10	14	14
	12"	11	18	6	14	18	18
	16"	19	34	10	23	34	34
	24"	45	83	23	59	83	83

NOTES:

1. THRUST BLOCKS TO BE CONSTRUCTED OF 3000 PSI CONCRETE.
2. BLOCKS TO BE POURED AGAINST UNDISTURBED SOIL.
3. THRUST BLOCKS SHALL HAVE CONTACT WITH FITTINGS ONLY AND REMAIN CLEAR OF PIPE AND JOINTS.
4. ALL FITTINGS TO BE SEPARATED FROM JOINTS BY A 3' TO 6' LENGTH OR PIPE.

Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	HORIZONTAL THRUST BLOCKS DWG. NO. 335 — January 2014

REQUIRED TIE DOWN

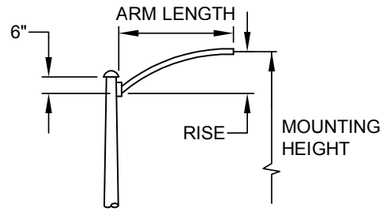
CUBIC FEET OF CONCRETE

FITTING TYPE		22-1/2° BEND	45° BEND	90° BEND
TYPICAL INSTALLATION				
PIPE SIZE	4"	8	27	40
	6"	19	34	60
	8"	31	56	100
	10"	48	89	160
	12"	62	120	220
	16"	121	225	400
	24"	270	530	970

NOTES:

1. THRUST BLOCKS TO BE CONSTRUCTED OF 3000 PSI CONCRETE.
2. BLOCKS TO BE POURED AGAINST UNDISTURBED SOIL.
3. THRUST BLOCKS SHALL HAVE CONTACT WITH FITTINGS ONLY AND REMAIN CLEAR OF PIPE AND JOINTS.
4. ALL FITTINGS TO BE SEPARATED FROM JOINTS BY A 3' TO 6' LENGTH OR PIPE.

Rev.	Date			
		CSW ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS
				DWG. NO. 340
				January 2014



SINGLE ARM POLE

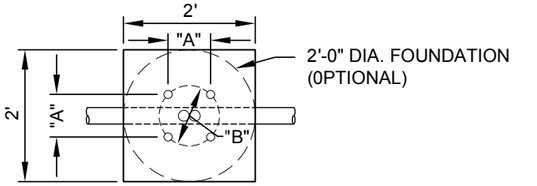
TABLE 1 SINGLE-ARM STEEL POLES

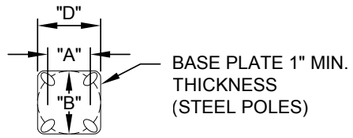
MOUNTING HEIGHT	ARM LENGTH/RISE		CODE	GAUGE	AMERON POLE PRODUCTS SHAFT SIZE	AMERON POLE PRODUCTS CAT. NO.
27'-6"	4'	1'-6"	35-7119	1O OR 11	7.5'x3.8"X26'-6"	PL-264
28'-0"	6'	2'-0"	35-7170			PL-266
28'-0"	8'	2'-0"	35-7252			PL-268
32'-6"	6'	2'-0"	35-7120		8.0"x3.7"x31'-0"	PL-316
32'-6"	8	2'-0"	35-7230			PL-318
35'-0"	6'	2'-0"	35-7122		8.0"x3.4"x33'-6"	PL-336
35'-0"	8'	2'-0"	35-71254			PL-338

NOTES:

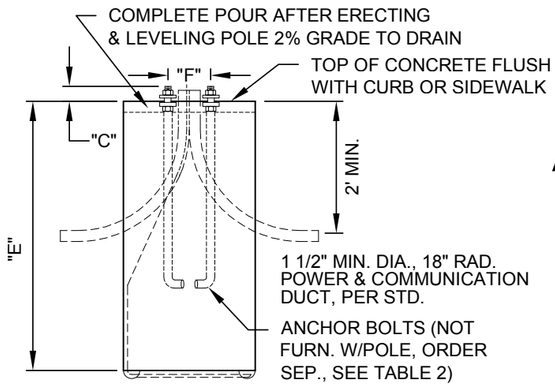
A. POLES SHALL BE IN ACCORDANCE WITH APPLICABLE REQUIREMENTS OF EEI-NEMA STANDARDS FOR STREET LIGHTING POLES, EET PUBLICATION ON. TDJ 135.
B. ALL STEEL POLES TO HAVE 1/2" SQUARE GROUNDING OR NUT HOLDER IN THE POLE, DIRECTLY OPPOSITE THE HANDHOLE.
C. ALL STEEL POLES TO BE FURNISHED GALVANIZED. GALVANIZED STEEL POLES AND ANCHOR BOLTS TO BE HOT DIP GALVANIZED PER LATEST REVISION OF ASTM SPEC. A153.
D. ALL STEEL POLES TO BE FURNISHED WITH HANDHOLE AND HANDHOLE COVER.
E. POLES TO BE FURNISHED WITH POLE BASE COVERS.
F. SHIPPING INSTRUCTIONS: SHIP ALL LOOSE PARTS FOR ONE POLE IN ONE PACKAGE.

Rev.	Date			
		CSW ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS
				DWG. NO. 400
				January 2014

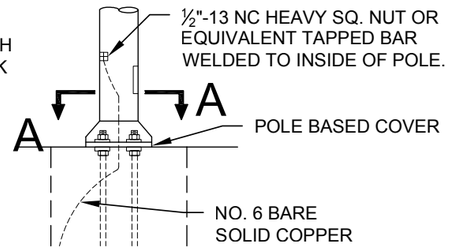




SECTION A-A
(COVER REMOVED)



FOUNDATION



BASE DETAILS

TABLE 2 SIZE	ANCHOR BOLTS CODE
1"x36"x4"	19-0076

TABLE 1 ANCHOR BASE DATA FOR STEEL POLES

STEEL POLE		DIMENSIONS (IN.)							
POLE CODE NO.	MOUNTING HEIGHT	A	B	C	D			E	F
					UNION METAL	AMERON	VALMONT		
35-7119 & 35-7188	27'-6"	7-3/4	11	2-3/4	11-1/2	11-1/2	11-1/2	4'-6"	1"x36"x4"
35-7120 & 35-7189	32'-6"				11-1/2	11-1/2	11-1/2		
35-7122 & 35-7191	35'-0"				11-1/2	11-1/2	11-1/2		

CODE NUMBER PROVIDES FOR SINGLE ANCHOR BOLT, TWO GALVANIZED REGULAR HEX NUTS AND TWO GALVANIZED ROUND WASHERS. ANCHOR BOLTS TO BE FURNISHED WITH 6" MINIMUM THREAD LENGTH.

ANCHOR BOLTS TO BE COMPLETELY HOT-DIP GALVANIZED, OR HOT-DIP GALVANIZED ON THREADED END TO 2" MINIMUM BELOW END OF THREADS.

NOTES:

A. WHEN SETTING POLES WITH FLAT STEEL BASES PROVIDE A DRAINAGE HOLE UNDER THE STEEL PLATE TO THE CENTER OF THE POLE. FROM HOLE BEFORE CONCRETE SETS USING A PIECE OF WELDING ROD OR EQUIVALENT.

Rev.	Date

CSW | ST2 ENGINEERING GROUP

SOLANO COMMUNITY COLLEGE

SOLANO COMMUNITY COLLEGE DISTRICT

STANDARD DETAILS

CAST-IN-PLACE LIGHTING FOUNDATION

DWG. NO. 405

January 2014

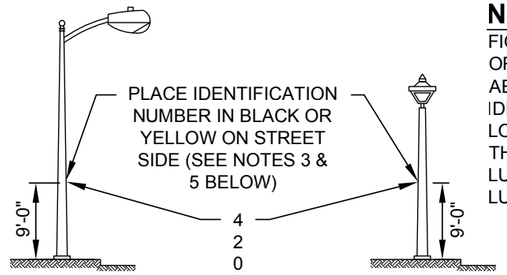
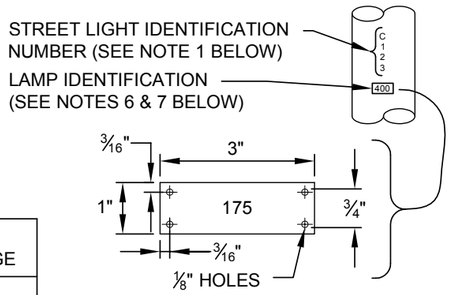


FIG. 1
SINGLE LUMINAIRE

FIG. 2
POST TOP LUMINAIRE

NOTE:

FIGURES 1, 2 AND 3 ARE METAL OR CONCRETE POLES OR POSTS. IN THOSE INSTALLATIONS WHERE AESTHETICS IS CONSIDERED IMPORTANT, THE IDENTIFICATION NUMBER MAY BE PLACED ON THE LOWER SIDE OF THE LUMINAIRE IN THE VICINITY OF THE 3x3 LAMP IDENTIFICATION DECAL. ON POST TOP LUMINAIRES, IT MAY BE PUT ON THE BASE OF THE LUMINAIRE OR ON THE POLE BELOW THE LUMINAIRE.



ARRANGEMENT OF NUMBERS ON POLE

TABLE A

LAMP I.D. TAGS MERCURY/HIGH PRESSURE SODIUM LAMP	
TAG MARKINGS	LAMP RATING WATTS
70	70
100	100
150	150
175	175
200	200
250	250
400	400
700	700
1000	1000

TABLE B

NUMERAL ON I.D. DECAL	LAMP WATTAGE
7	70
10	100
15	150
17	175
20	200
25	250
40	400
70	700
X1	1000

TABLE C

BACKGROUND COLOR ON I.D. DECAL	LAMP TYPE
BLUE	MERCURY
GOLD	HIGH PRESSURE SODIUM
PURPLE	LED

NOTES:

1. USE ENAMEL PAINT OR ENAMEL TRANSPARENT STREET LIGHT NUMBERS ON METAL OR CONCRETE POLES OR POSTS. USE 2" LETTERS.
2. USE 2" HIGH ALUMINUM NUMBERS ON WOOD POLES. ATTACH WITH 1 1/2"x0.113" DIA. ALUMINUM NAILS.
3. ON WOOD POLES TAGS ARE ETCHED AND OXIDIZED BLACK. MATERIAL IS NO. 20 GAUGE (0.032 IN. ALUMINUM).
4. ON SPECIAL LAMINATED WOOD POSTS OR POLES MONEL TAPE MAY BE USED.
5. USE BLACK IDENTIFICATION NUMBERS ON LIGHT POLES AND YELLOW IDENTIFICATION NUMBERS ON DARK POLES.
6. USE 1 1/4" ENAMEL PAINT TRANSFERS OR ENAMEL TRANSPARENTS LAMP IDENTIFICATION NUMBERS ON METAL OR CONCRETE POLES OR POSTS.
7. NOT REQUIRED IF THE MANUFACTURER HAS PROVIDED A 3"X3" LAMP IDENTIFICATION DECAL ON THE LOWER SIDE OF THE LUMINAIRE BEHIND THE REFRACTOR. THE IDENTIFYING CODE FOR LAMP WATTAGES AND TYPE IS SHOWN IN TABLES B & C.

Rev.	Date

CSW | ST2 ENGINEERING GROUP

SOLANO COMMUNITY COLLEGE

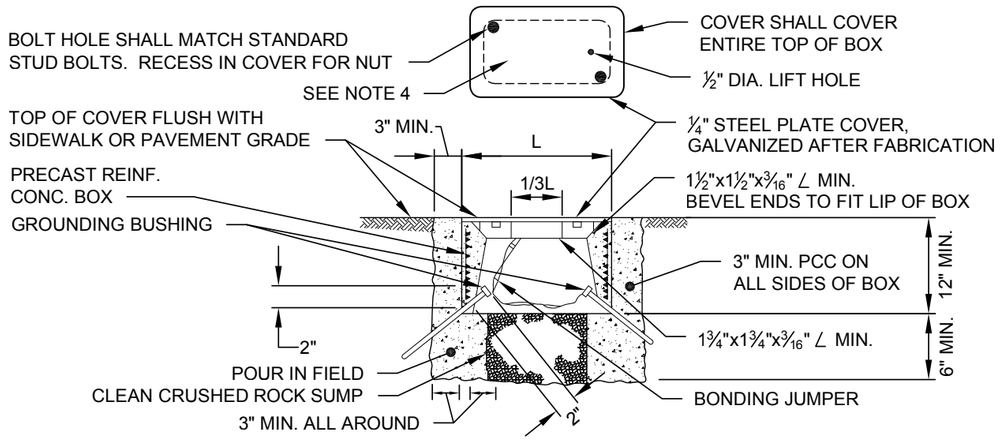
SOLANO COMMUNITY COLLEGE DISTRICT

STANDARD DETAILS

IDENTIFICATION OF STREET LIGHT LUMINAIRES

DWG. NO. 410

January 2014



NO. 3 1/2(T) & NO.5(T) TRAFFIC PULL BOX

(CONCRETE BOX ONLY)

DIMENSION TABLE

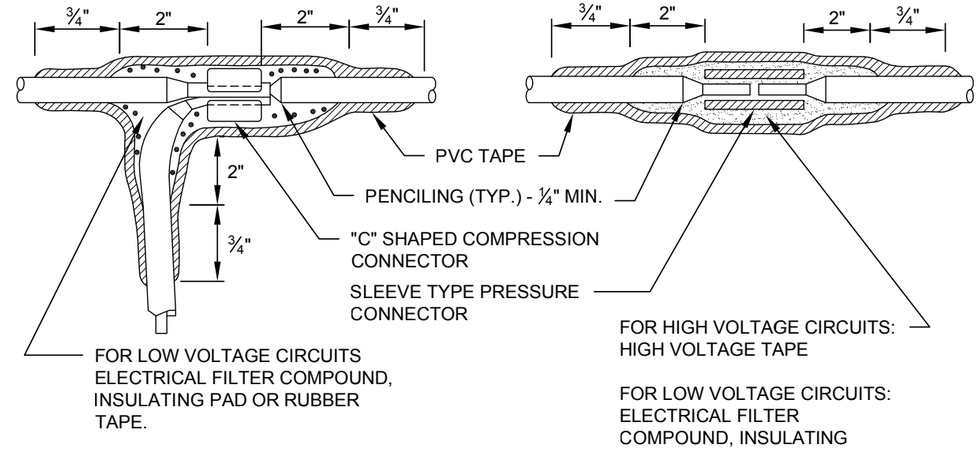
PULL BOX	CONCRETE BOX		PLASTIC BOX		CONCRETE OR PLASTIC COVERS				
	MIN. ** THICK-NESS	MIN. DEPTH BOX AND EXTENSION	MIN. ** THICK-NESS	MIN. DEPTH BOX AND EXTENSION	L***	W***	R	EDGE THICKNESS	EDGE TAPER
NO. 3½"	1"	NO EXTENSION	5/16"	NO EXTENSION	15 3/8"	10 1/8"	1 1/8"	1 3/4"	1/8"
NO. 5	1"	22"	5/16"	20"	23 1/4"	13 3/4"	1 1/4"	2"	1/8"
NO. 6	1 1/2"	24"	3/8"	20"	30 5/8"	17 5/8"	1 1/4"	2"	1/8"
NO. 6T	2"	11"	DOES NOT APPLY		33"± *	20"± *	0"	1/4"	NONE

* STEEL COVER ** EXCLUDING CONDUIT WEB *** TOP DIMENSION

NOTES:

1. USE STEEL COVER AND SPECIAL CONCRETE FOOTING, SHOWN, WHEN PULL BOX IS TO BE INSTALLED WHERE SUBJECT TO VEHICULAR TRAFFIC LOADING. STEEL COVER SHALL HAVE EMBOSSED NON-SKID PATTERN.
2. TOP OF PULL BOXES SHALL BE FLUSH WITH ADJACENT GRADE, SIDEWALK, CURB, OR OTHER STRUCTURE.
3. CONDUIT SHALL NOT EXTEND MORE THAN 3" INTO PULL BOX.
4. PULL BOX COVERS SHALL BE MARKED AS FOLLOWS:
   A. "SIGNAL" FOR TRAFFIC SIGNAL CIRCUITRY
   B. "STREET LIGHTS" FOR STREET LIGHT CIRCUITRY
   C. "SPRINKLER-CONTR." FOR SPRINKLER CONTROL CIRCUITRY
5. BONDING JUMPER FOR METAL COVERS SHALL BE 36" LONG, MINIMUM.
6. PULL BOXES SHALL NOT BE LOCATED IN HANDICAPPED RAMP AREAS OR IN DRIVEWAYS.

Rev.	Date		SOLANO COMMUNITY COLLEGE DISTRICT	PULL BOXES	
			STANDARD DETAILS	DWG. NO. 415	January 2014
CSW ST2 ENGINEERING GROUP		SOLANO COMMUNITY COLLEGE			

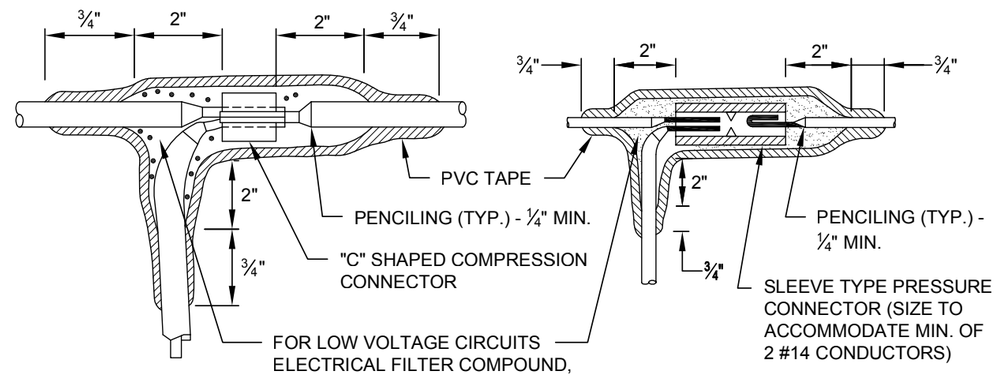


TYPE "C" SPLICE

(BETWEEN I FREE-END AND I THROUGH CONDUCTOR)

TYPE "S" SPLICE

(BETWEEN 2 FREE-ENDS)



TYPE "T" SPLICE

(FOR 3 FREE-ENDS)

TYPE "ST" SPLICE

(FOR SIGNAL CONDUCTORS)

Rev.	Date		SOLANO COMMUNITY COLLEGE DISTRICT	SPLICE DETAILS	
			STANDARD DETAILS	DWG. NO. 420	January 2014
CSW ST2 ENGINEERING GROUP		SOLANO COMMUNITY COLLEGE			

TABLE 1. HORIZONTALLY MOUNTED HIGH PRESSURE SODIUM VAPOR LUMINAIRES

LUMINAIRE DESCRIPTION			LUMINAIRES APPROVED FOR PURCHASE ARE GE OR EQUAL	
LAMP SIZE (WATT)	BALLAST		TWIST LOCK RCPT.	GENERAL ELECTRIC CATALOG NUMBER
	TYPE	RATING VOLTS		
70	REGULATOR	120	YES	M2AR07SIN2AMS22
100	REGULATOR	120	YES	M2AR10SIN2AMS22
200	REGULATOR	120	YES	M2AR20SIN2AMS22

NOTES:

1. ALL DIMENSIONS ARE MINIMAL.
2. RUBBER TAPES SHALL BE ROLLED AFTER APPLICATION.
3. WHEN PVC TAPE IS USED AS FINAL LAYER, PAINT FINISHED SPLICE WITH ELECTRICAL INSULATING COATING.

INSULATING METHODS:

LOW VOLTAGE CIRCUITS (0-600 VOLTS)

1. COMPLETELY COVER THE SPLICE AREA WITH AN ELECTRICAL INSULATING COATING AND ALLOW TO DRY.
2. APPLY 2 LAYERS OF ELECTRICAL INSULATING PAD WITH MINIMUM THICKNESS OF 1/8" EACH LAYERS OR 2 LAYERS, HALF LAPPED, SYNTHETIC OIL RESISTANT, SELF FUSING RUBBER TAPE.
3. APPLY 3 LAYERS HALF LAPPED PVC TAPE.

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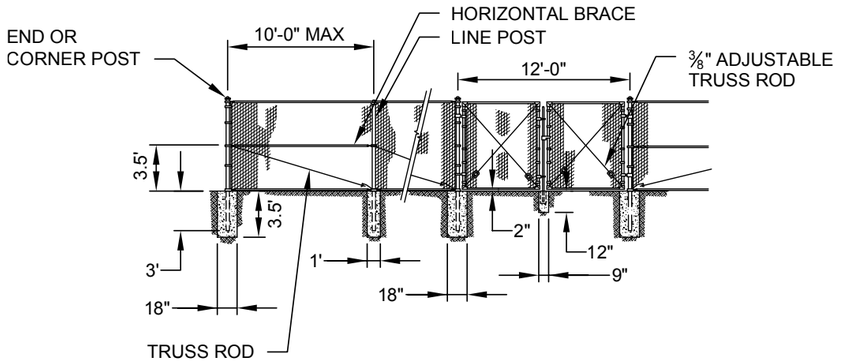
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	SPLICE NOTES
				DWG. NO. 425 / January 2014



6' CHAIN LINK FENCE

TYPICAL MEMBER DIMENSIONS						
LINE POSTS		CORNER	GATE	END POSTS	TOP RAIL & BRACES	
ROUND	ROLL FORM	ROUND			ROUND	
2⅜" O.D. 3.65 #/FT	2.25"x1.7" 2.64 #/FT	2⅞" O.D. 5.79 #/FT	3½"x3½" 5.14 #/FT	3"x3"	1⅝" O.D. 2.27 #/FT	1¼" x 1⅝" 1.35 #/FT

NOTES:

1. FABRIC SHALL BE 9 GAUGE 3 1/2"x5 1/2" MESH WITH PLASTIC PICKETS 2 1/2"x3/8" ATTACHED TO FABRIC USING TWO GALVANIZED STAPLES (CRIMPED ON BACK SIDE). TOP & BOTTOM SELVAGES TO BE KNUCKLED. PLACE FABRIC ON PUBLIC SIDE.
2. FABRIC TO BE ATTACHED TO END & CORNER POSTS USING 1/4"x3/4" STRETCHER BARS.
3. BOTTOM TENSION WIRE SHALL BE 7 GAUGE GALVANIZED STEEL COIL SPRING WIRE. FABRIC TO BE ATTACHED TO TENSION WIRE USING 9 GAUGE HOG RINGS AT 18" SPACING.
4. FABRIC TIES-(a) TO POST USE 6 GAUGE STEEL POST CLIPS OR 9 GAUGE GALVANIZED STEEL WIRE TIES AT 14" SPACING (b) TO TOP RAIL USE 9 GAUGE GALVANIZED STEEL WIRE TIES AT 14" MAX. SPACING.
5. TRUSS RODS SHALL BE ADJUSTABLE 3/8" GALVANIZED STEEL RODS.

Rev.	Date			
		CSW | ST2 ENGINEERING GROUP	SOLANO COMMUNITY COLLEGE DISTRICT STANDARD DETAILS	CHAIN LINK FENCE
				DWG. NO. 500 / January 2014

31 00 00
EARTHWORK AND GRADING

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes general requirements, products, and methods of execution relating to on-site earthwork. Any work within the public right-of-way shall be constructed to the standards of Solano County, and the State of California Department of Transportation. Earthwork includes, but is not limited to, the following:
   1. Grading.
   2. Material.
   3. Excavation.
   4. Filling and backfilling.
   5. Soil Sterilant.
   6. Termiticide.

B. Provide labor, material and equipment and services necessary to complete the excavations, recompaction and finish grading as specified and indicated on Plans.
   1. Obtain permit from local authorities.
   2. Provide surveying for grading operations.
   3. Provide shoring design.
   4. Provide dewatering operations.
   5. Provide Site grading, cut, fill and finish.
   6. Provide excavation and backfill for filling construction, including trenches within building lines.
   7. Preparation for subgrade for building slabs, walks, pavements, and landscaping.
   8. Provide distribution of stockpiled topsoil.
   9. Provide sub-base course for walks and pavements.
   10. Provide sand and gravel for capillary break/moisture barrier under building slabs.
   11. Provide sub-surface drainage backfill for walls and trenches.
   12. Provide Engineered fills for building slabs and foundations.

C. The work includes removal and legal disposal off the site of debris, rubbish and other materials resulting from clearing and grubbing operations.

D. Work specified in Related Sections:
   1. Section 31 10 00 – SITE PREPARATION.
   2. Section 31 23 33– TRENCHING, BACKFILLING, & COMPACTING.

1.2 DEFINITIONS

A. Engineered Fill:
   1. Soil or soil-rock material approved by Project Manager and transported to the site by the Contractor in order to raise grades or to backfill excavations.
   2. The District's Testing Agency will make sufficient tests and/or observations for the purpose of issuing a written statement that specification requirement.

B. On-site Material: Soil or earth material obtained from required on-site excavation.

C. Excavation: Consists of the removal of material encountered to subgrade elevations and the re-use or disposal of materials removed.

D. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below sub-base, drainage fill, or topsoil materials.

E. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.

F. Base Course: The layer placed between the sub-base and surface pavement in a paving system.

G. Relative Compaction: In-place dry density of soil expressed as percentage of maximum dry density of same materials, as determined by laboratory test procedure American Society for Testing and Materials (ASTM) D1557.

H. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below top soil, rock base course, or drainage fill.

1.3 SYSTEM DESCRIPTION

A. Requirements:
   1. Grades and elevations are to be established with reference to bench marks referenced on Plans.
   2. Maintain Engineering markers such as monuments, bench marks and location stakes. If disturbed or destroyed, replace.

B. Criteria:
   1. The character of the material to be excavated or used for subgrade is not necessarily as indicated.
   2. Ground water elevations indicated are those existing at the time subsurface investigations were made and do not necessarily represent ground water elevation at the time of construction.
   3. Blasting will not be permitted.
   4. Remove material in an approved manner.

C. Shoring Design: Where shoring is required by State Law or determined by the Contractor to be necessary, provide proposed excavation shoring method for review prior to commencement of excavation requiring shoring. Include the following information:
   1. Basic design assumptions.
   2. Design Calculations.
   3. Describe materials or shoring system to be used.
   4. Indicate whether or not any components will remain after filling or backfilling.
   5. The shop plans for the proposed shoring system.
   6. Coordinate with the Construction Documents and identify any proposed modifications or deviations.
   7. Certification of the above by a registered professional civil or structural Project Manager licensed by the State of California.

D. Dewatering Plan: Based upon site surface and subsurface conditions, including available geotechnical and hydrological data, provide a system to perform the following:
   1. Lower the ground water level two feet below the bottom of excavation.
   2. Relieve the hydrostatic pressure below the subgrade to prevent uplift.
   3. Prevent surface drainage from accumulating within work area.
   4. Legally discharge and dispose of excess water.
   5. Submit description of basic components of proposed dewatering system and its planned method of operation.

E. Safety:
   1. The Contractor shall take all necessary precautions to eliminate the exposure of workers, students, staff and the public to asbestos fibers, including but not limited to: dust control measures and measures included in Section 93106 and Section 93105 of California Code of Regulations, Title 17.

1.4 SUBMITTALS

A. Comply with provisions of Section SUBMITTAL PROCEDURES.

B. Product Data: Manufacturer's literature and data, including, where applicable, capacity, labels, or other markings on equipment made to the specified standards for materials, for the following:
   1. Imported materials.
   2. Class II aggregate base (CDT Section 26).
   3. Storm Water Pollution Prevention / Erosion Control Plans.
   4. Permit/Notice of Intent (N.O.I.), for discharge of storm run-off from the construction site.
   5. Soil Sterilant.
   6. Termiticide.

C. Test Reports: Submit following reports for import material directly to Project Manager from the Contractor's testing services:
   1. Test reports on borrow material.
   2. Density test reports.
   3. One optimum moisture-maximum density curve for each type of soil encountered.
   4. Report of actual unconfined compressive strength and/or results of bearing test of each strata tested.
   5. At least one laboratory optimum moisture - maximum dry density curve for each type of soil encountered.

D. Shoring Design: Submit 4 copies of shoring design and shop plans; none will be returned unless a concern is observed.

E. Submit description of dewatering methods proposed for use.

F. Submit description of vibratory compactors proposed for use when requesting placement of backfill and fill materials in layers greater than 6 inches thick.

G. Samples:
   1. 20-lb. Samples, sealed in air-tight containers, of each proposed fill and backfill soil material from on-site or borrow sources.
   2. 12-by-12 inch sample of filter fabric.

1.5 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:
   1. Comply with State of California Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."
   2. Comply with State of California Code of Regulations (CCR).
   3. Comply with State of California Construction Safety Orders, Latest Edition (CAL/OSHA).
   4. San Mateo Department of Public Works, Standards and Specifications and Plans.

B. Soil Testing:
   1. District will engage a geotechnical testing agency, to include testing soil materials proposed for use in the work and for quality control testing during excavation and fill operations.
   2. Test results will be distributed in compliance with Section TESTING AND INSPECTION.

C. Codes and Standards:
   1. Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.
   2. Storm Water Pollution Prevention and Monitoring Plan to be prepared by others.
   3. Statewide General Permit to Discharge Storm Water associated with construction activity.

D. Comply with the latest editions of the following Standards and Regulations:
   1. American Society for Testing and Materials (ASTM):
      a. C33: Concrete Aggregates.
      b. C125: Standard Terminology Relating to Concrete and Concrete Aggregates.
      c. C136: Sieve Analysis of Fine and Coarse Aggregates.
      d. C566: Total Evaporable Moisture Content of Aggregate by Drying.
      e. D421: Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants.
      f. D422: Particle Size Analysis of Soil.
      g. D854: Specific Gravity of Soils.
      h. D1556: Density of Soil by the Sand Cone Method.
      i. D1557: Laboratory Compaction Characteristics of Soil Using Modified Effort
      j. D2216: Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures.
      k. D2487: Classification of Soils for Engineering Purposes.
      l. D2922: Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
      m. D2937: Density of Soil in Place by Drive Cylinder Method.
      n. D3017: Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
      o. D4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
   2. California Code of Regulations, Title 24, Part 2 - Basic Building Regulations, Chapter 24 - Excavations, Foundations, and Retaining Walls.
   3. California Department of Transportation (CDT) Standard Specifications:
      a. Section 17:
      b. Section 18:
      c. Section 19: Earthwork.
   4. CAL/OSHA, Title 8.
   5. Other authorities having jurisdiction

E. Geotechnical Engineering Services:
   1. Geotechnical Engineer will observe grading observations during preparation offsite, excavation, and compaction of fill materials.
   2. Make visits to site to familiarize himself generally with progress and quality of work.
   3. Make field observations and tests to enable him to form opinions regarding adequacy of site preparation, acceptability of fill materials and extent to which earthwork construction and relative compaction comply with specifications requirements.
   4. Examine conditions exposed in foundation excavations.

F. Site Information:
   1. Soil borings and other exploratory operations may be made by Contractor at no cost to District. Submit proposed boring locations for review prior to performing the work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect materials of this section before, during and after installation; objects designated to be retained; and the installed work of other trades.

B. In the event of damage to any of these items, immediately make repairs or replacements necessary to the acceptance of the Project Manager and at no additional cost to the District.

C. Comply with provisions of Section 01500 - TEMPORARY FACILITIES AND CONTROLS where necessary to control dust and noise on and near the work caused by operations during performance of the Work.

1.7 PROJECT CONDITIONS

A. Environmental Requirements:
   1. When unfavorable weather conditions necessitate interrupting filling and grading operations, prepare areas by compaction of surface and grading to avoid collection of water.
   2. Provide adequate temporary drainage to prevent erosion.
   3. After interruption, reestablish compaction specified in last layer before resuming work.
   4. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to District.
   5. Protect existing streams, ditches and storm drain inlets from water-borne soil by means of straw bale dikes, filter fiber dams, or other methods as approved by the Project Manager.

B. Barricade open excavations and post with warning lights.
   1. Comply with requirements of Section TEMPORARY FACILITIES AND CONTROLS.
   2. Operate warning lights as recommended by authorities having jurisdiction.
   3. Protect structures, utilities, sidewalks, pavements, and other facilities immediately adjacent to excavations, from damages caused by settlement, lateral movement, undermining, washout and other hazards.

C. Protection of Subgrade: Do not allow equipment to pump or rut subgrade, stripped areas, footing excavations, or other areas prepared for project.

D. At Contractor's option, a working pad of granular material may be laid to protect footing and floor subgrade soils from disruption by traffic during wet conditions.

E. Transport all excess soils materials by legally approved methods to disposal areas.
   1. Coordinate with the Project Manager.
   2. Sufficient topsoil and fill material shall be retained from the site to complete project requirements.
   3. Any additional topsoil and fill requirements shall be the responsibility of the Contractor.

F. Use of explosives will not be permitted.

G. Dust Control Requirements: At all times during earthwork operations and until final completion and acceptance of the earthwork, the Contractor shall prevent the formation of an airborne dust and dirt nuisance from interfering with the surrounding normal operations. The Contractor shall effectively stabilize the site of work in such a manner that it will confine dust particles to the immediate surface of the work and to obtain a minimum of 40 percent emissions reduction by applying a dust palliative. The dust palliative shall be non-petroleum based. Water alone is not considered to be a dust palliative. The dust palliative shall be applied at the rate and method in conformance with Section 18, "Dust Palliative," of the CDT Standard Specifications and as recommended and/or specified by the manufacturer. Contractor shall assume liability for all claims related to dust and dirt nuisances.

1.8 Existing Utilities

A. The Contractor shall contact local utility agencies prior to construction and arrange for the shut-off of all utilities serving the buildings to be demolished. Coordinate work required to abandon active lines with the Project Manager and the District.

B. Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during excavation operations.

C. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult utility Project Manager immediately for directions.
   1. Cooperate with the District and public and private utility companies in keeping their respective services and facilities in operation.
   2. Repair damaged utilities to the satisfaction of the utility District.

D. Do not interrupt existing utilities serving facilities occupied and used by the District or others, except when permitted in writing by Project Manager and then only after acceptable temporary utility services have been provided.

1.9 SEQUENCING AND SCHEDULING

A. The sequence of operations shall be reviewed by the Project Manager prior to commencement of any work.

B. Coordinate operations with relocation of existing utilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General:
   1. Fill material will be subject to approval of the Geotechnical Engineer.
   2. For approval of imported fill material, notify the Project Manager at least 7 days in advance of intention to import material, designated proposed borrow area, and permit the Geotechnical Engineer to sample as necessary from borrow area for purpose of making acceptance tests to prove quality of material.
   3. The Geotechnical Engineer's report on acceptability shall be final and binding.
   4. During grading operations, soil types other than those analyzed in the geotechnical report for the project, may be encountered.
   5. Consult the Geotechnical Engineer to determine the suitability of these soils.

B. Engineered Fill Material: Soil excavated from site or imported conforming to requirements for fill material.
   1. Imported materials should have a plasticity index not less than 5 nor greater than 15, as determined by ASTM D4318; and expansion index not exceeding 20, as determined by UBC Specification 29-2; and a particle size not exceeding 3 inches as determined by ASTM D422.

C. Topsoil: Friable clay loam surface soil found in a depth of not less than 10 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones and other objects over 2 inches in diameter, and without weeds, roots and other objectionable material.
   1. Use topsoil for top 2 feet of fill against exterior walls, except at paving, sidewalks, and slabs.
   2. Topsoil may also be used beyond the area within 5 feet of building, except under paving and sidewalks.
   3. Confirm suitability of stockpiled materials.

D. Sand: Clean, well-graded fine to coarse sand with not more than 2 percent passing the #200 sieve based on wet sieve analysis.
   1. Provide 2-inch layer under building slabs on grade or as specified by the geotechnical report for this project.
   2. Provide at other locations indicated.
   3. Where coarse sand is required, provide sand no finer than No. 40 sieve.

E. Graded Rock Base:
   1. Bedding for utility piping: Washed, uniformly graded mineral aggregate ASTM D448 with percentage composition of dry weight conforming with following limits:
      a. Passing 1-inch Sieve: 100 percent.
      b. Passing 3/4-inch Sieve: 90-100 percent.
      c. Passing No. 4 Sieve: 0-10 percent.
   2. Base at Slab-on-Grade: As specified in the geotechnical report for this project.
   3. Absorption of water to saturated-surface dry condition shall not exceed 3 percent of oven-dry weight of a sample.

F Backfill material for use behind retaining walls shall be a granular material consisting of sand, broken rock, or a mixture of sand and gravel containing no size larger than 2 ½ inches and not more than 15 percent passing the No. 200 sieve.

G Imported Fill Requirements: Imported fill, where required, shall be non expansive granular soil, free of organic matter and deleterious substances. Imported fill material shall conform to the following requirements:

1. Grading:

U. S. Sieve Size	Percentage Passing Sieve
2 ½ inch	100
No. 8	25-45
No. 200	0-10

2. Be thoroughly compactable without excessive voids.
3. Meet the following plasticity requirements:
   a. Maximum Plasticity Index of 12, as determined by ASTM D4318.
   b. Maximum Liquid Limit of 35, as determined by ASTM D4318

H. Imported Fill for Planting Areas: Imported fill for use in planting areas shall be sandy loam weed free soil. Submit analysis from certified Soil and Plant Lab. Coordinate with Landscape Engineer.

J. Pea Gravel: 3/8 inch to ½ inch washed, uncrushed gravel. Use at drainage pipe and at other locations indicated.

K. Filter Fabric: Provide filter fabrics that meet or exceed the listed minimum physical properties determined according to ASTM D4759 and the referenced standard test method in parentheses.
1. Grab Tensile Strength (ASTM D4632): 100 lb.
2. Apparent Opening Size (ASTM D4751): #100 U.S. Standard sieve.
3. Permeability (ASTM D4491): 150 gallons per minute per square foot.

L. Drainage Pipe:
1. Perforated corrugated plastic drainage tubing meeting ASTM F405, with continuous integral nylon filter screen.
2. Acceptable Manufacturers and Products: Advanced Drainage Systems "DrainGuard," Hancor "Agri-Flow."
3. Provide couplings, elbows and other fittings as recommended by pipe manufacturer.

M. Water: Clean and free from deleterious amounts of acids, alkalis, salts and organic matter.

2.2 SOIL STERILANT

A. Soil Sterilant shall be Treflan E.C. or approved equivalent.

2.3 TERMITICIDE

A. Termiticide shall be Permethrin, Denon, or approved equivalent.

PART 3 - EXECUTION

3.1 GENERAL

A. Prior to commencement of earthwork, become thoroughly familiar with site conditions.

B. In the event discrepancies are found, immediately notify the Project Manager in writing, indicating the nature and extent of differing conditions.

C. No earthwork shall be performed without physical presence or acceptance of the Geotechnical Engineer.

D. The Geotechnical Engineer's acceptance is required by these specifications; notify the Project Manager at least 48 hours prior to commencing any phase of earthwork.
1. No phase of work shall proceed until prior phase has been accepted by the Geotechnical Engineer.
2. Work shall not be covered up or continued until acceptance of the Geotechnical Engineer shall give written notice of conformance with the specifications upon completion of grading.

E. Compacting:
1. Compact by power tamping, rolling or combinations thereof as accepted by the Geotechnical Engineer.
   a. Where impractical to use rollers in close proximity to walls, stairs, etc., compact by mechanical tamping.
   b. Scarify and recompact any layer not attaining compaction until required density is obtained.
2. Compaction by flooding, ponding or jetting will not be permitted, unless specifically accepted by the Geotechnical Engineer.

F. Hazardous Materials
1. If any materials are encountered that may be hazardous (as defined in Section 25117 of the California Health and Safety Code), inform the Project Manager verbally within 24 hours and in writing within 2 business days. Upon discovery, material is to remain undisturbed until investigation by Project Manager is complete. The removal and disposal of hazardous materials, if discovered, is not part of the scope of work of this Division for this project.

3.2 SITE PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities which are to remain from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations. Set up tree protection measures prior to commencing grading or demolition operations.

B. Clearing and Grubbing:
1. Remove from area of designated project earthwork all improvements and obstructions, including designated concrete curbs or slabs, asphaltic concrete, all tree and shrub roots, any buried utility and irrigation lines, and other matter determined by the Geotechnical Engineer to be deleterious.
   a. In all new planting areas, remove existing base material.
   b. Use only hand methods for grubbing inside the drip line of trees indicated to be left standing.
2. Retain on the site all trees and shrubs, unless otherwise indicated on the plans as existing trees to be removed.
3. Remove or fill existing basements left from removed structures as appropriate to areas. Compact in accordance with requirements of these specifications.
4. Removed material shall become property of the Contractor and shall be removed from site, unless otherwise indicated on the plans or specified herein.
5. Holes resulting from removal of underground obstructions that extend below finish grades shall be cleared and backfilled with Engineered fill.
6. Existing Trees to remain:
   a. Verify the locations of existing trees to be preserved.
   b. Replace existing trees to remain that are damaged during construction at no additional

cost to the District and provide replacement specimens of same species per coordination with the Project Manager.

c. Carefully make clean cuts at roots and branches of trees indicated to be left standing, where such roots and branches obstruct new construction. Paint cuts over ½ inch in size with tree pruning compound.

7. Contact District Arborist 48 hours prior to cutting any trees

C. Topsoil:
1. Strip topsoil to whatever depths encountered in manner to prevent intermingling with the underlying subsoil or other objectionable material.
2. Remove heavy growths of grass from areas before stripping. Where trees are indicated to be left standing, stop topsoil stripping a sufficient distance to prevent damage to the main root system.
3. Stockpile topsoil in storage piles to freely drain surface water.
4. Cover storage piles if required to prevent windblown dust.

3.3 EXISTING UTILITIES

A. Protect existing utilities that are to remain in operation as specified.

B. Demolish and completely remove from the site existing underground utilities indicated and/or required to be removed in order to complete the work. See Section 02200 – SITE PREPARATION.

C. Movement of construction machinery and equipment over existing pipes and utilities during construction shall be at contractor's risk.

D. Excavation made with power-driven equipment is not permitted within 2 feet of any known utility or subsurface structure.
1. Use hand or light equipment for excavating immediately adjacent to or for excavations exposing a utility or buried structure.
2. Start hand or light equipment excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured.
3. Preserve and irrigate removed sections of existing turf for salvage and/or replacement and restoration.
4. Support uncovered lines or other existing work affected by excavation until approval for backfill is obtained.
5. Report damage of utility line or subsurface structures immediately to Project Manager

3.4 PREPARATION OF SUBGRADE

A. Expansive soils are anticipated to basement depth.
1. Review the necessity for overexcavation of expansive soils.

B. Scarify building pad, exterior flatwork and pavement subgrade to a depth of at least 8 inches and work until uniform and free from large clods.
1. Bring expansive subgrades to 2 to 5 percentage points above the optimum moisture content and compact to 90 percent of the maximum laboratory dry density, in accordance with ASTM D1557.
2. Bring nonexpansive subgrades to or slightly above the optimum moisture content and compact to 90 percent of the maximum laboratory dry density in accordance with ASTM D1557.
3. Increase compaction of the upper 12 - 18 inches of pavement subgrades to 95 percent of the maximum laboratory dry density per ASTM D1557 for nonexpansive subgrades.

3.5 DEWATERING

A. Do not allow water from surface drainage or underground sources to accumulate in excavations, unfinished fills, or other low areas.

B. Provide and maintain ample means and devices to remove water promptly and dispose properly of water entering excavations or other parts of the work to prevent softening of exposed surfaces.

C. Dewater by methods which will ensure dry excavation and preservation of finish lines and grades of excavation bottoms.

D. Prior to excavating below ground water level, place dewatering system in operation.
1. Lower the ground water level a minimum of 2 feet below the bottom of the excavation.
2. Relieve the hydrostatic pressure in pervious zones below the subgrade elevation to prevent uplift.
3. Use screens and gravel packs as necessary to prevent removal of fines from the soil.

E. Operate the dewatering system continuously, 24 hours a day, 7 days a week until construction work below existing ground water lever is completed.
1. Measure and record the performance of the dewatering system.
   a. Perform at the same time each day.
   b. Use piezometers and observation wells.
2. After placement of initial slabs and backfill, the ground water level may be allowed to rise.
3. At no time allow ground water to rise higher than 1 foot below the prevailing level of excavation or backfill.
4. Have a back-up pump and system available for immediate use.

F. Dispose of water away from the work in suitable manner without damage to adjacent property or menace to public health.

G. Do not drain water into work being built or under construction without prior acceptance of the Project Manager.

H. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the District.

3.6 SITE EXCAVATION

A. General
1. All supports, shoring, and sheet piling required for the sides of excavations or for protection of adjacent existing improvements shall be provided and maintained by the Contractor. The adequacy of such systems shall be the complete responsibility of the Contractor.
2. Earth and rock, regardless of character and subsurface conditions, shall be excavated to depths shown on plans and to the neat dimensions of the footings wherever practicable, to permit pouring of footings and grade beams without use of side forms, except at slab perimeters.
3. Large rocks, pieces of concrete or other obstructions, if encountered during the excavation/scarifying operations, shall be removed and disposed of by the Contractor off the site in a legal manner.
4. Where footing excavation is too deep, backfill shall be concrete. Where footings are overdug laterally, side forms shall be employed for backfill with rock fill or concrete backfill shall be used (Contractor's option).
5. Where forming is required, only that excavation necessary to permit placing and removal of forms shall be done.

6. Bottoms of all footings and foundations trenches shall be subject to testing by the Geotechnical Engineer. Corrective measures as directed by the Project Manager shall be executed promptly.

B. Excavate subgrade as required to allow for finish grades shown on plans, as required for structural fill or otherwise required for proper completion of the work.

C. Remove and replace subgrade materials designated by Geotechnical Engineer as unsuitable.

3.7 FILL AND COMPACTING

A. See Section 31 23 33 – TRENCHING, BACKFILLING, & COMPACTING for fill and compacting requirements.

3.8 MOISTURE CONTROL

A. Do not place, spread or roll fill material during unfavorable weather conditions or when fill material is excessively wet.

B. Do not resume operations until moisture content and fill density are satisfactory to the Geotechnical Engineer.

C. Provide berms or channels to prevent surface water from flooding excavations. Promptly remove water collecting in depressions.

D. Where soil has been softened or eroded by flooding or by placement during unfavorable weather, remove damaged areas and recompact as described for fill and compaction.
   1. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material.
   2. Prevent free water appearing on surface during or subsequent to compaction operation.
   3. Remove and replace, or scarify and air dry, soil material too wet to permit compaction to specified density.
   4. Soil material removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

3.9 GRADING

A. General: Uniformly grade areas of work including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
   1. All areas covered by the project, including excavated and filled areas and adjacent transition areas, shall be uniformly graded so that finished surfaces are at the elevations established by the plans. Planter areas to receive future topsoil shall be graded below finished grade to allow for such material.
   2. Finished surfaces and surfaces to receive paving and aggregate base shall be smooth, compacted, and free from irregular surface drainage.
   3. Ditches, gutters, and swales shall be finished to permit proper surface drainage.
   4. All surface areas, except paved and sloped embankments exceeding 8:1, shall be hydroseeded.

B. Grading Tolerances:
   1. Excavations shall not exceed 0.10-foot variation from dimensions and elevations shown or noted, unless otherwise approved by Project Manager.
   2. Fill and backfill shall be placed with tolerance of plus or minus 0.10 foot if placed in layers.
   3. Grading shall be done within plus or minus 0.10 foot typically; areas under slabs, walks or pavements shall be graded within tolerance of 0 to 0.10 foot.
   4. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 foot above or below required subgrade elevations.
   5. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10 foot above or below required subgrade elevation.
   6. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than ½ inch above or below required subgrade elevation.

C. Compaction: After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.

3.10 SOIL STERILIZATION

A. General: Soil sterilant shall be applied to prepared subgrade or after installation of rock or aggregate base as recommended by the manufacturer. Sterilant shall be applied uniformly at the rate recommended by the manufacturer to all areas beneath asphalt concrete pavement, brick pavement, concrete pavement, or on-grade concrete slabs including sidewalks, curbs, and gutters and areas between the inner and outer security fences. In addition to ground areas treated, sterilant shall be applied below expansion or control joints, and at all areas where pipe, ducts, or other features penetrate slabs.

3.11 TERMITICIDE

A. Termiticide shall be applied to soils as recommended by the manufacturer. Termiticide shall be applied uniformly at the rate recommended by the manufacturer to all areas beneath and around wood frame structures.

3.12 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Removal of Excess Excavated Material: Excess material shall be removed by the Contractor off the site in a legal manner.

B. Testing Agency Services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.
   1. Perform field in-place density tests according to ASTM D1556 (sand cone method), ASTM D2167 (Rubber Balloon Method), or ASTM D2937 (Drive Cylinder Method), as applicable.
      a. Field in-place density tests may also be performed by the nuclear method according to ASTM D2922, provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D1556. With each density calibration check, check the calibration curves furnished with the moisture gauges according to ASTM D3017.
      b. When field in-place density tests are performed using nuclear methods, make calibration checks of both density and moisture gauges at beginning of work on each different type of material encountered, and at intervals as directed by the Project Manager.
   2. Footing Subgrade: At footing subgrades, perform at least one test of each soil stratum to v verify design bearing capacities. Subsequent verifications and approval of other footing subgrades may be based on a visual comparison of each subgrade with related tested strata when acceptable to the Project Manager.
   3. Paved and Building Slab Areas; At subgrade and at each compacted fill and backfill layer, perform at least one field in-place density test for every 2,000 square feet or less of paved area or building slab, but in no case fewer than three tests.
   4. Foundation Wall Backfill: In each compacted backfill layer, perform at least one field in-place density test for each 100 feet or less of wall length, but no fewer than two tests along a wall face.

5. Trench Backfill: In each compacted initial and final backfill layer, perform at least one filed in-place density test for each 150 feet or less of trench, but not fewer than two tests.

C. Number and location of test shall be at option of the Geotechnical Engineer.

D. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, recompact and retest until required density is obtained.

E. After grading is completed and the testing agency has completed observation of the work, permit no further excavation or filling, except as approved by Project Manager.

3.13 PROTECTION

A. Protect newly graded areas from traffic and erosion. Install erosion control mat and straw wattles as directed by the Project Manager. Keep free of trash and debris.

B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

C. Where completed compacted areas are disturbed by subsequent construction operation or adverse weather, scarify surface, reshape, compact to required density and provide other corrective work, including retesting, prior to further construction.

3.14 CLEAN-UP

A. Comply with requirements of Section CLEANING.

End of Document

Section 31 10 00
SITE PREPARATION

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes general requirements, products, and methods of execution relating to site preparation, unless otherwise noted. This section applies to:
1. Surface and subsurface demolition.
2. Backfilling of excavations and depressions.
3. Coordination, demolition and/or relocation of existing utilities.
4. Prior to start of demolition of facilities, shut-off, disconnect, cut, and cap where required, underground utility services to facilities.
5. Removal of A.C. pavement driveway and concrete pavement, concrete pads, and A.C. curbing.
6. Removal of cyclone wire, wood fences and barricades.
7. Removal of storm drainage piping, catch basins, and manholes.
8. Removal of vegetation and trees as specified herein.

B. Contractor shall provide labor, material and equipment required for demolishing, cutting, removing and disposing of existing construction as designated and shown on the Plans for the following as required, unless otherwise noted.

C. Related Sections:
1. Section 31 10 00- EARTHWORK AND GRADING.
2. Section 31 23 33- TRENCHING, BACKFILLING, AND COMPACTING.

1.2 SUBMITTALS

A. Comply with requirements of Section SUBMITTAL PROCEDURES.

B. Submit all permits and certificates required for the project, for record purposes.

C. Demolition schedule and proposed methods and operations.

D. Permits and notices authorizing demolition.

E. Letter or certificates of severance of utilities services from the affected agencies or utilities.

F. Proposed haul route(s) from the demolition worksite to an authorized disposal site.

G. Permit for transport and disposal of debris.

H. Make arrangements of disposing of waste and excess materials at a legally licensed landfill/disposal facility outside worksite and pay cost thereof.

I. Photograph existing conditions of existing structure surfaces, equipments, and adjacent improvements that might be misconstrued as damage related to removal operations. File photographs with Project Manager prior to start of work.

J. Submit Proposed dust control measures.

K. Submit Proposed noise control measures.

L. Work Schedule: Submit a proposed schedule of work items to be performed, and a description of how the work is to be accomplished, for the Project Manager's review.

M. Report of inspections conducted with the Project Manager before and after performing work.

1.3 QUALITY ASSURANCE

A. Comply with the following Standards: American National Standards Institute, Inc. "American National Standard Safety Requirements for Demolition" (ANSI A10.6 and A10.8).

B. Regulatory Agencies:
1. Comply with rules and regulations of State of California, California Code of Regulations, Title 8, Industrial Relations, Chapter 4, Subchapter 4, "Construction Safety Order."
2. Comply with applicable local and state agencies having jurisdiction.
3. Comply with governing EPA notification regulations.

C. Secure all required Permits or Certificates for demolition or discontinuance of utilities, prior to beginning the work.

1.4 PROJECT CONDITIONS

A. Disposition of Existing Improvements:
1. All materials indicated to be removed shall become the property of the Contractor; dispose of these outside the project site.
   a. Do not dispose of removed materials to the general public by sale, gift or in any other manner at the Site.
   b. These provisions shall not be construed as limiting or prohibiting sale or disposal of such materials at the Site to duly licensed Contractors or material suppliers, provided materials are removed from the construction site by the Contractor.
2. All removal of debris from the site, including removal of inventory to site of storage, is part of this Contract and shall be done by Contractor's employees and no others.

B. Salvage and Reuse:
1. Where units or items of existing work are designated to be removed and reused in the new work or are to become salvage, remove such units or items carefully.
   a. Use tools and methods that will not damage such units or items.
   b. Protect underlying or adjoining work from damage.
   c. Salvaged items shall be cleaned by the Contractor.

C. Protection:
1. Erect and maintain temporary bracing, shoring, lights, barricades, except construction barricades for subsequent new construction, warning signs, and guards necessary to protect public, the District's employees, finishes, improvements to remain and adjoining property from damage, all in accordance with applicable regulations.
2. Wet down areas affected by this work as required preventing dust and dirt from rising.

D. Scheduling:
1. Coordinate with the District in scheduling noisy or dirty work.
2. Schedule work at the District's convenience to cause minimal interference with the District's normal operations.
3. Jackhammering shall be coordinated with the District and College to minimize disturbance of classes.

E. Traffic Circulations: Ensure minimum interference with roads, streets, driveways, sidewalks, and adjacent facilities.
1. Do not close or obstruct public thoroughfares without first obtaining the required permit or permission of the responsible jurisdiction.
2. Where closing of a vehicular or pedestrian traffic circulation route is necessary, provide adequate directional signs to minimize the potential for confusion.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas affected by work of this Section and verify following:
1. Disconnection of utilities as required.
2. That utilities serving occupied portions of buildings on and off the site will not be disturbed or that temporary utility services have been provided.
3. Removal by the District of the District's personal property, movable furniture and equipment items not designated for relocation.

B. Where existing conditions conflict with representations of the Construction Documents, notify the Project Manager and obtain clarifications. Do not perform work affecting the conflicting conditions until clarification of the conflict is received.

3.2 PREPARATION

A. Verify that the area to be demolished or removed has been vacated, or adequate space made available to perform the work.

B. Arrange for, and verify termination of utility services to include removing meters and capping of lines.

C. Lay out cutting work at Job Site and coordinate with related work for which cutting is required.

3.3 DEMOLITION

A. If confirmed or suspected hazardous materials are encountered during operations, stop operations immediately and notify the Project Manager.

B. Perform work in accordance with ANSI A10.6-1969 unless otherwise noted.

C. Provide noise and dust abatement as required to prevent contamination of adjacent areas.
   1. Remove all materials not designated as salvage, in their entirety.
   2. Remove building foundations in their entirety, unless otherwise indicated on the plans.

D. Fill voids in the land left by the removal of existing structures as follows:
   1. In accordance with the requirements of Section 31 00 00 – EARTHWORK AND GRADING. Grade finished remaining surface to the contours shown, or if not shown, to match the existing natural contours.

E. Lower, or remove, heavy structural framing members by hoist or crane.

F. Concrete and Masonry:
   1. Demolish concrete and masonry in sections, less than 3 feet in any direction.
   2. Method of cutting shall be limited to saw cutting and torch.

3.4 CUTTING

A. Make new openings neat.

B. Do not cut or alter structural members and any utilities including appurtenances unless indicated to do so in the Construction Documents, or written approval is received from the Project Manager.

C. Take care not to damage reinforcing or structural steel scheduled to remain in place.

D. Concrete: Cut new openings in concrete by coring and saw cutting. Saw run-bys will not be permitted.

3.5 PREPARATION FOR NEW FINISH WORK

A. Where demolished surfaces are scheduled to receive new finishes, Contractor shall restore such substrate to a condition ready to receive the scheduled new finishes, including grinding or leveling.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

B. Burning of demolished materials off District's property in a legal manner.

3.7 FIELD QUALITY CONTROL

A. The Project Manager will accompany the Contractor before and after performance of work to observe physical condition of existing structures or improvements involved.

End of Document

Section 31 23 33
TRENCHING, BACKFILLING AND COMPACTING

PART 1 – GENERAL

1.1 SUMMARY

A. Provide labor, material, equipment, and services necessary to complete the backfilling and compacting as necessary for this project. Section includes, but is not limited to:
   1. Select Backfill Material.
   2. Aggregate Base.
   3. Detectable Tape.
   4. Trench Excavation.
   5. Pipe Bedding.
   6. Trench Backfill.
   7. Trench Surfacing.

B. Work specified in Related Sections:
   1. Section 31 10 00 – SITE PREPARATION
   2. Section 31 00 00 – EARTHWORK AND GRADING
   3. Section 33 10 00 – WATER SYSTEMS
   4. Section 33 30 00 – SANITARY SEWER
   5. Section 33 40 00 – STORM DRAINAGE

1.2 DEFINITIONS

A. Engineered Fill:
   1. Soil or soil-rock material approved by the Project Manager and transported to the site by the Contractor in order to raise grades or to backfill excavations.
   2. Contractor shall provide sufficient tests, and a written statement that all materials brought onto the project site comply with specification requirements.

B. Excavation: Consists of the removal of material encountered to subgrade elevations.

C. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below base.

D. Base: The layer placed between the subgrade and surface pavement in a paving system.

E. Relative Compaction: In-place dry density of soil expressed as percentage of maximum dry density of same materials, as determined by laboratory test procedure American Society for Testing and Materials (ASTM) D1557.

1.3 SYSTEM DESCRIPTION

A. Requirements:
   1. Comply with the recommendations of the Geotechnical Engineer .
   2. Protect existing trees to remain. No grading is permitted under the drip line of protected trees.
   3. Excavations for appurtenant structures, such as, but not limited to, manholes, transition structures, junction structure, vaults, valve boxes, catch basins, thrust blocks, and boring pits, shall be deemed to be in the category of trench excavation.
   4. Unless otherwise indicated in the Plans, all excavation for pipelines shall be open cut.

1.4 SUBMITTALS

A. Comply with provisions of Section 01 32 19 – SUBMITTAL PROCEDURES.

B. Test Reports: Submit the following report for import material directly to the Project Manager from the Contractor's testing services:
   1. Compaction test reports for aggregate base.

C. Submit description of compactors proposed for use when requesting placement of base material.

1.5 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:
   1. Comply with State of California Business and Transportation Agency, Department of Transportation (Caltrans) latest edition of "Standard Specifications." (CSS).
   2. Comply with State of California Code of Regulations (CCR).
   3. Comply with State of California Construction Safety Orders, Latest Edition (CAL/OSHA).

B. Soil Testing:
   1. District to engage a geotechnical testing agency, to include compaction testing and for quality control testing during fill operations.
   2. Test results will be submitted to the Project Manager.

C. Codes and Standards:
   1. Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.
   2. California Department of Transportation (CDT):
      a. Section 19: Earthwork.
      b. Standard Test Methods: No. 202.
   3. American Society for Testing and Materials (ASTM):
      a. D1556: Density of Soil by the Sand Cone Method.
      b. D1557: Moisture Density Relations of Soils and Soil-Aggregate Mixtures

1.6 DELIVERY, STORAGE AND HANDLING

A. Protect materials before, during and after installation.

B. Comply with provisions of Section 01 51 00 - TEMPORARY FACILITIES AND CONTROLS where necessary to control dust and noise on and near the work caused by operations during construction activities.

1.7 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the District.
   2. Protect existing streams, ditches and storm drain inlets during work on this project.

B. Barricade open excavations and post with warning lights.
   1. Comply with requirements of Section 01 51 00 - TEMPORARY FACILITIES AND CONTROLS.
   2. Operate warning lights and barricades as required.
   3. Protect structures, utilities, sidewalks, pavements, and other facilities immediately adjacent

to excavations, from damages caused by settlement, lateral movement, undermining, washout, and other hazards.

C. Protection of Subgrade: Do not allow equipment to pump or rut subgrade, stripped areas, footing excavations, or other areas prepared for project.

D. Transport all excess soils materials by legally approved methods to disposal areas.
   1. Coordinate with the Project Manager.
   2. Any additional fill requirements shall be the responsibility of the Contractor.

1.8 EXISTING UTILITIES

A. Locate existing underground utilities in the areas of work. For utilities that are to remain in place, provide adequate means of protection during excavation operations.
   1. Locating of existing underground utilities shall include but not be limited to pot-holing prior to the start of construction.

B. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult Project Manager, Facilities, and/or utility agency immediately for directions.
   1. Cooperate with the Project Manager and public and private utility companies in keeping their respective services and facilities in operation.
   2. Repair damaged utilities to the satisfaction of the agency with jurisdiction.

C. Do not interrupt existing utilities serving facilities occupied and used by the District or others, except when permitted in writing by the Project Manager and then only after acceptable temporary utility services have been provided.

1.9 SEQUENCING AND SCHEDULING

A. The sequence of operations shall be reviewed by the Project Manager prior to commencement of any work.

PART 2 – PRODUCTS

2.1 MATERIALS

A. General:
   1. Import materials will be subject to approval of the Geotechnical Engineer.
   2. For approval of imported fill material, notify the Project Manager at least 7 days in advance of intention to import material.

B. Select backfill material shall be gravel, free of clay or organic matter and shall conform to the following gradation:

Sieve Size	Percentage Passing
1 inch	100
¾ inch	90 – 100
No. 4	35 – 60
No. 200	2 - 9

C. For gas pipe and fuel piping select backfill shall be clean, graded building sand conforming to the following gradation:

Sieve Size	Percentage Passing
No. 4	100
No. 200	0 - 5

D. Water: Clean and free from deleterious amounts of acids, alkalis, salts and organic matter.

2.2 BURIED WARNING AND IDENTIFICATION TAPE

A. Polyethylene plastic and metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 75 mm 3 inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.
   1. Warning Tape Color Codes.
      Red: Electric.
      Yellow: Gas, Oil; Dangerous Materials.
      Orange: Telephone and Other Communications.
      Blue: Water Systems.
      Green: Sewer Systems.
      White: Steam Systems.
      Gray: Compressed Air.
   2. Warning Tape for Metallic Piping: Acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of tape shall be 0.003 inch. Tape shall have a minimum strength of 1500 psi lengthwise, and 1250 psi crosswise, with a maximum 350 percent elongation.
   3. Detectable Warning Tape for Non-Metallic Piping: Polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of the tape shall be 0.004 inch. Tape shall have a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 920 mm 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.

2.3 DETECTION WIRE FOR NON-METALLIC PIPING

A. Detection wire shall be insulated single strand, solid copper with a minimum of 12 AWG.

PART 3 – EXECUTION

3.1 GENERAL

A. Prior to commencement of work, become thoroughly familiar with site conditions.

B. In the event discrepancies are found, immediately notify the Project Manager in writing, indicating the nature and extent of differing conditions.

C. Backfill excavations as promptly as work permits.

D. Do not place Engineered fill or backfill until rubbish and deleterious materials have been removed and areas have been approved by the Project Manager.

E. Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.

F. In excavations, use satisfactory excavated or borrow material.

G. Under grassed areas, use satisfactory excavated or borrow material.

3.2 COMPACTING

A. Compact by power tamping, rolling or combinations thereof.
   1. Where impractical to use rollers in close proximity to walls, stairs, etc., compact by mechanical tamping.
   2. Scarify and recompact any layer not attaining compaction until required density is obtained.

3.3 SITE PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, which are to remain, from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the District.

3.4 EXISTING UTILITIES

A. Identity the location of existing utilities.
   1. Prior to trenching, the Contractor shall excavate at locations specifically indicated on the Plans, if any, and where new lines cross other utilities of uncertain depth and determine the elevation of the utility in question to ensure that the new line will clear the potential obstruction.
   2. The Contractor shall contact Underground Service Alert (USA) at 1-800-227-2600 for assistance in locating existing utilities.
   3. If, after the excavation, a crossing utility does present an obstruction, then the line and grade of the new line will be adjusted as directed by the Project Manager to clear the utility.

B. Protect all existing utilities to remain in operation.

C. Movement of construction machinery and equipment over existing pipes and utilities during construction shall be at Contractor's risk.

E. Excavation made with power-driven equipment is not permitted within 2 feet of any known utility or subsurface structure.
   1. Use hand or light equipment for excavating immediately adjacent to known utilities or for excavations exposing a utility or buried structure.
   2. Start hand or light equipment excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured.
   3. Support uncovered lines or other existing work affected by excavation until approval for backfill is obtained.
   4. Report damage of utility line or subsurface structures immediately to the Project Manager.

F. Backfill trenches resulting from utility removal in lifts of 8 inches maximum.

3.5 TRENCH EXCAVATION

A. General
   1. Excavation shall include removal of all water and materials that interfere with construction. The Contractor shall remove any water which may be encountered in the trench by pumping or other methods during the pipe laying, bedding and backfill operations. Material shall be sufficiently dry to permit approved jointing.
   2. Excavation shall include the construction and maintenance of bridges required for vehicular and pedestrian traffic, support for adjoining utilities.
   3. The Contractor shall be responsible to safely direct vehicular and pedestrian traffic through or around his/her work area at all times.
   4. The Contractor shall relocate, reconstruct, replace or repair, at his/her own expense, all improvements which are in the line of construction or which may be damaged, removed, disrupted or otherwise disturbed by the Contractor.

B. Existing Paving and Concrete:
   1. Existing pavement over trench shall be sawcut, removed, and hauled away from the job. Existing pavement shall be neatly sawcut along the limits of excavations.
   2. Existing concrete over the trench shall be sawcut to a full depth in straight lines either parallel to the curb or a right angles to the alignment of the sidewalk.
   3. Boards or other suitable material shall be placed under equipment outrigging to prevent damage to paved surfaces.

C. Trench Width:
   1. The maximum allowable trench widths at the top of the pipe shall be as follows:

Pipe Type	Trench Width (Maximum)
Copper	Outside diameter of barrel plus 18 inches
Plastic	"
Vitrified Clay	"
Ductile-Iron	"
Reinforced Concrete	"

      a. The maximum trench width shall be inclusive of all shoring.
      b. If the maximum trench width is exceeded, the State's representative may direct the Contractor to encase or cradle the pipe in concrete at no additional charge.
   2. For pipes 3 inch diameter and larger, the free working space on each side of the pipe barrel shall not be less than 6 inches.

D. Open Trench:
   1. The maximum length of open trench shall be 300 feet or the distance necessary to accommodate the amount of pipe installed in a single day, whichever is greater. No trench shall be left open at the end of the day.
   2. Provisions for trench crossings and free access shall be made at all street crossings, driveways, water gate valves, and fire hydrants.

E. Excavation Bracing:
   1. The excavation shall be supported and excavation operations shall be conducted in accordance with the California Industrial Accident Commission and CAL/OSHA.
   2. The Contractor shall, at his/her own expense, furnish, put in place, and maintain such sheeting and bracing as may be required to support the sides of all excavations (whether above or below the pipe grade), and to prevent any movement which could in any way diminish the required trench section or otherwise injure or delay the work. The sheeting and bracing shall be withdrawn in a manner such as to prevent any earth movement that might overload the pipe.

F. Excavated Material:
   1. All excavated material not required for backfill shall be immediately removed and properly disposed of in a legal manner by the Contractor.
   2. Material excavated in streets and roadways shall be laid alongside the trench no closer than 2 feet from the trench edge and kept trimmed to minimize inconvenience to public traffic.
   3. Provisions shall be made whereby all storm and wastewater can flow uninterrupted in gutters or drainage channels.

3.6 PIPE BEDDING

A. Bedding Excavation: The trench shall be excavated below the grade of the pipe bottom to the following minimum depths:

Pipe Type	Depth
Copper	6 inch
Reinforced Concrete	6 inch
Plastic: 2 inch diameter and smaller	6 inch
Plastic: over 2 inch diameter	6 inch
Ductile Iron	6 inch

1. Stabilization of Trench Bottom: When the trench bottom is unstable due to wet or spongy foundation, trench bottom shall be stabilized with gravel or crushed rock. The State's inspector will determine the suitability of the trench bottom and the amount of gravel or crushed rock needed to stabilize a soft foundation. Soft material shall be removed and replaced with gravel or crushed rock as necessary.
2. Placement of Bedding Material: The trench bottom shall be cleaned to remove all loose native material prior to placing select backfill material. Sufficient select backfill material shall be placed in trench and tamped to bring trench bottom up to grade of the bottom of pipe. The relative compaction of tamped material shall be not less than 90 percent. It is the intention of these requirements to provide uniform bearing under the full length of pipe to a minimum width of 60 percent of the external diameter.

3.7 TRENCH BACKFILL

A. Initial Backfill:
   1. Prior to trench backfill, the condition of the trench and laying of pipe must be inspected and approved by the Inspector of Record.
   2. Select backfill material shall be used for initial backfill. After the pipe has been properly laid and inspected, select backfill material shall be placed on both sides of the pipe and compacted to final depth as follows:

Pipe Type	Depth
Copper	12 inches above top of pipe
Plastic: less than 3 inches diameter	12 inches above top of pipe
Plastic: 3 inches diameter and larger	12 inches above top of pipe
Ductile Iron	12 inches above top of pipe
Reinforced Concrete	12 inches above top of pipe

   3. Compaction: Initial backfill compaction shall be by mechanical means. The initial backfill material shall be hand tamped in layers not exceeding 4 inches in uncompacted depth and shall be brought up uniformly on both sides of the pipe to avoid bending or distortional stress. After hand tamping, the relative compaction of the initial backfill material shall be not less than 90 percent.
   4. Pipe Detection: In trenches containing pressurized plastic pipes, tracer wire shall be placed directly above the pipe and shall be connected to all valves, existing exposed tracer wires, and other appurtenances as appropriate.

B. Subsequent Backfill:
   1. Above the level of initial backfill, the trench shall be backfilled with non-expansive native material from trench excavation or with imported select backfill material (Contractor's option). Subsequent backfill shall be free of vegetable matter, stones or lumps exceeding 3 inches in greatest dimension, and other unsatisfactory material. The Inspector of Record shall approve the backfill material prior to placement.
   2. Subsequent backfill compaction shall be by mechanical means with backfill material placed in layers not exceeding 8 inches in loose depth. Each layer shall be thoroughly compacted before succeeding layers are placed. The use of machine tampers, except manually held types, shall not be permitted.
   3. Subsequent backfill shall be compacted to a relative compaction of not less than 90 percent except the relative compaction shall not be less than 95 percent within 2-1/2 feet of finished permanent surface grade or 1-1/2 feet below the finished subgrade, whichever is greater.

C. Jetting and Ponding:
   1. Jetting of trench backfill is not permitted.

D. Compaction Testing:
   1. Compaction testing shall be in accordance with California Test Method ASTM D1556 or D1557.

3.8 TRENCH SURFACING

A. Unpaved Areas:
   1. In unimproved areas, the trench surface shall be restored to its original condition. No mounds of earth shall be left along the trench. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
   2. Where completed compacted areas are disturbed by subsequent construction operation or adverse weather, scarify surface, reshape, compact to required density and provide other corrective work, including retesting, prior to further construction.

B. Temporary Surfacing:
   1. Temporary surfacing shall be a minimum of 2 inches of cutback asphalt on 10 inches of Class 2 aggregate base and shall be placed at all trench locations subject to vehicular or pedestrian traffic.
   2. Temporary surfacing shall be laid within one day after backfilling (except where the Contractor elects to place permanent surfacing within this time period).
   3. Before the trenching area is opened for traffic, all excess dirt, rock, and debris shall be removed, the street surface shall be swept clean and the pavement shall be washed down with a water truck and pressure nozzle.
   4. Temporary surfacing shall be maintained to prevent the occurrence of mudholes and prevent the surface from settling below 1 inch or rising more than 1 inch from the existing pavement grade.

3.9 FILL AND COMPACTING

A. General Requirements:
   1. Backfill excavations as promptly as work permits.
   2. Do not place Engineered fill or backfill until rubbish and deleterious materials have been removed and areas have been approved by the Project Manager.
   3. Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.
   4. In excavations, use satisfactory excavated or borrow material.
   5. Under grassed areas, use satisfactory excavated or borrow material.

B. After subgrade compaction has been approved by the Geotechnical Engineer , spread the Engineered fill materials in 6 to 8 inch loose lifts and uniformly mixed during the spreading operation.
   1. Bring non-expansive fill materials to or slightly above the optimum moisture content and compacted to at least 85 percent of the maximum laboratory dry density, pert ASTM D1557.
   2. Bring non-expansive aggregate fill materials to or slightly above the optimum moisture content and compacted to at least 95 percent of the maximum laboratory dry density, pert ASTM D1557.
   3. Do not compact the top 12 inches of soil in the planting areas.
   4. Fill sections greater than 5 feet in depth shall be compacted to at least 95 percent.

C. Repeat compaction procedure until proper grade is attained.

D. Rocks generated during site earthwork may be used in fill when conforming to material specifications.

3.10 MOISTURE CONTROL

A. Do not resume operations until moisture content and fill density are satisfactory to the Inspector.

3.11 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Testing Services: Allow testing agency to test each backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.

B. When testing agency reports that backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, recompact and retest until required density is obtained.

3.12 PROTECTION

A. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

B. Where completed compacted areas are disturbed by subsequent construction operation or adverse weather, scarify surface, reshape, compact to required density and provide other corrective work, including retesting, prior to further construction.

3.13 CLEAN-UP

A. Remove all debris, equipment, tools and materials upon completion prior to final inspections to the satisfactions of the Project Manager.

B. In unpaved areas without landscaping, cover with straw erosion control blanket. Follow manufacturer's recommendations for installation. Provide and place straw wattles or biodegradable fiber logs across the slope at the midpoint and along the downhill edge of site. No soil is to be left uncovered at the completion of construction.

End of Document

Section 32 10 00
DEMOLITION

PART 1 – GENERAL

1.1 SUMMARY

A. Provide labor, material, and equipment required for demolishing, cutting, removing and disposing of existing construction as designated or required to provide for new work.

B. Coordinate all work with capping or sealing of existing utilities.

C. Related Sections:
1. Section 31 10 00 - SITE PREPARATION
2. Section 31 00 00 - EARTHWORK AND GRADING
3. Section 31 23 33 - TRENCHING, BACKFILLING, AND COMPACTING

1.2 SUBMITTALS

A. Comply with requirements of the SUBMITTAL PROCEDURES and GENERAL CONDITIONS.

1.3 QUALITY ASSURANCE

A. Comply with the following Standards: American National Standards Institute, Inc. "American National Standard Safety Requirements for Demolition" (ANSI A10.6 and A10.8).

B. Regulatory Agencies:
1. Comply with rules and regulations of State of California, California Code of Regulations, Title 8, Industrial Relations, Chapter 4, Subchapter 4, "Construction Safety Order."
2. Comply with applicable local and state agencies having jurisdiction.
3. Comply with governing EPA notification regulations.
4. Comply with applicable state and local regulations regarding dust and noise mitigation during construction.

C. Secure all required Permits or Certificates for demolition prior to beginning the work.

1.4 PROJECT CONDITIONS

A. District assumes no responsibility for actual condition of the site to be altered.
1. Conditions existing at time of inspection for bidding purpose will be maintained by District as far as practical.

B. Disposal of Existing Improvements:
1. All materials removed shall become the property of the Contractor; dispose of these materials outside the project site.
   a. Do not dispose of removed materials to the general public by sale, gift or in any other manner at the project site.
   b. These provisions shall not be construed as limiting or prohibiting sale or disposal of such materials at the Site to duly licensed Contractors or material suppliers, provided materials are removed from construction site by the Contractor.
2. All removal of debris from the site, including removal of inventory to site of storage, is part of this Contract and shall be done by Contractor's employees and

no others.

C. Salvage:
1. Recycle AC pavement and Class II AB where practical.
2. Recycle concrete where practical.
3. Items indicated to be salvaged shall be removed carefully, cleaned, and returned to the District. Coordinate with the Project Manager.

D. Protection:
1. Erect and maintain temporary bracing, shoring, lights, barricades, except construction barricades for subsequent new construction, warning signs, and guards necessary to protect public, the District's employees, adjacent improvements to remain, and adjoining property from damage, all in accordance with applicable regulations.
2. Wet down areas affected by this work as required to prevent dust and dirt from rising.

E. Scheduling:
1. Coordinate with the Project Manager in scheduling noisy or dirty work.
2. The Project Manager will supply a schedule of days on which no construction will be allowed.
3. Contractor shall take College schedule into consideration during construction.
4. Coordinate and schedule temporary water shut-downs and temporary water service with the Project Manager, Facilities, and the Water Department, and the Fire Department.

F. Traffic Circulations: Ensure minimum interference with roads, streets, driveways, sidewalks, and adjacent facilities.
1. Minimize obstruction to thoroughfares by first obtaining the required approval or permission of the responsible jurisdiction.
2. Where closing of a vehicular traffic circulation route is necessary, provide adequate directional signs to minimize the potential for confusion. Provide access at all times for emergency vehicles.

G. Safety:
1. The Contractor shall take all necessary precautions to eliminate the exposure of workers, students, staff, and the public to asbestos fibers, including but not limited to: dust control measures and measures included in Sections 93106 and 93105 of California Code of Regulations, Title 17.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

3. 1 EXAMINATION:

A. Where existing conditions conflict with representations of the Construction Documents, notify the Project Manager and obtain clarifications. Do not perform work affecting the conflicting conditions until clarification of the conflict is received.

3.2 PREPARATION

A. Verify that the area to be demolished or removed has been vacated, and adequate space has been made available to perform the work.

B. Lay out saw cutting and coordinate with related work for which saw cutting is required.

C. Contractor shall coordinate and arrange the shut down of utilities serving the site with Facilities, the Fire Department, and the Project Manager.

3.3 DEMOLITION

A. If known or suspected hazardous materials are encountered during operations, stop operations immediately and notify the Project Manager.

B. Perform work in accordance with ANSI A10.6-1969 unless otherwise noted.

C. Provide noise and dust abatement as required to prevent contamination of adjacent areas.

D. Remove all materials not designated as salvage, in their entirety.

E. If unknown items such as human remains are encountered during operations, stop operations immediately and notify the Project Manager.

F. The Project Manager will provide a list of any items to be stockpiled for future use. Stockpile location will be a site on campus determined by the Project Manager.

3.4 DEMOLITION AND REMOVAL OF AC PAVEMENT:

A. Sawcut pavement at edge of demolition area.

B. Break pavement and remove.

C. Remove any base material, gravel, and/or or any other non-native soil.

3.5 SAW CUTTING:

A. Make new openings neat.

B. Take care not to damage existing AC pavement to remain in place.

3.6 UTILITY REMOVAL:

A. Where utility removal is shown on the plans or required for construction, excavate to expose existing utility, demolish and remove the section of pipe or conduit. Cap section of pipe or conduit to remain. Mark end of utility with 12" piece of #4 rebar.

B. Included in demolition are any appurtenances, including but not limited to valves, valve boxes, and irrigation system components.

C. Backfill trench in accordance with requirements of Section 31 23 33 – TRENCHING, BACKFILLING, AND COMPACTING.

3.7 DISPOSAL OF DEMOLISHED MATERIALS:

A. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

B. Burning of demolished materials is prohibited.

3.8 FIELD QUALITY CONTROL:

A. The Project Manager will accompany the Contractor before and after performance of work to observe physical condition of existing structures or improvements involved.

End of Document

Section 32 12 33
PAVING AND SURFACING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes (but is not necessarily limited to):
   1. Asphalt Concrete Paving.
   2. Concrete Paving.
   3. Liquid Asphalt and Asphalt Emulsion.
   4. Aggregate Base.

B. Related work furnished under other sections but conforming to the provisions of this section:
   1. Subgrade preparation.
   2. Aggregate Base installation.

C. Related Sections:
   1. Section 32 00 00 - DEMOLITION
   2. Section 31 17 23 - PAVEMENT MARKING.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. A615: Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
   2. C150: Portland Cement.
   3. D1557: Moisture Unit Weight Relations of Soils and Aggregate Mixtures Using a 10 lb (4.5 kg) Rammer and 18 in. (457 mm) Drop.
   4. D1682: Breaking Loads and Elongation of Textile Fabrics.

B. California Code of Regulations (CCR): Title 24, Chapter 2-71, Site development Requirements for Handicapped Accessibility.

C. California Department of Transportation (C.D.T.):
   1. Standard Specifications:
      a. Section 26 Aggregate Bases.
      b. Section 37 Bituminous Seals.
      c. Section 39 Asphalt Concrete.
      d. Section 51 Concrete Structures.
      e. Section 52 Reinforcement.
      f. Section 73 Concrete Curbs and Sidewalks.
      g. Section 90 Portland Cement Concrete.
      i. Section 92 Asphalts.
      j. Section 93 Liquid Asphalts.
      k. Section 94 Asphaltic Emulsions.
   2. Traffic Manual.
   3. Highway Design.

D. Institute of Transportation Engineers: Transportation and Traffic Engineering Handbook.

1.3 SUBMITTALS

A. Requirements: Refer to Section SUBMITTAL PROCEDURES.

B. Asphalt Concrete Paving:

1. Provide two copies of material certificates signed by the material producer and the Contractor, certifying that each material item complies with or exceeds specified requirements.
2. The Contractor shall furnish a certified weight or load slip for each load of material used in the construction of the asphalt concrete pavement.

C. Concrete Paving: The Contractor shall furnish mill test reports on the cement, reinforcement bars, and aggregates, showing compliance with the respective specifications. The Testing Engineer may make concrete test cylinders and slump tests as deemed necessary to determine compliance with the Specifications.

D. Liquid Asphalt.

E. Pavement Reinforcement Fabric.

F. Tack Coat.

G. Pavement Reinforcement Mesh.

H. Structural Geotextile Fabric.

1.4 PROJECT CONDITIONS

A. Liquid Asphalt and Asphalt Emulsion:
1. Prime coat, seal coat, and paint binder shall be applied only when the ambient temperature is above 50° Fahrenheit and when temperature has not been below 35° Fahrenheit for 12 hours immediately prior to application.
2. Prime coat, fog coat, seal coat, and paint binder shall not be applied when base or surfaces are wet or contain excess moisture.

B. Asphalt Concrete Paving: Asphalt concrete surfaces shall be constructed only when ambient temperature is above 50° Fahrenheit and when base is dry.

1.5 GENERAL DESIGN CRITERIA

A. Services Areas: Approach ramps, driveways, and paved work areas in excess of 4 percent slope shall be provided with a rough texture for non-skid surface.

B. Walks and Paths: Concrete exterior slabs (walks, terraces, etc.) shall have a pitch of at least 1 percent.

C. Pavement Markings: All traffic control striping and pavement markings shall conform to the standards illustrated in the C.D.T. Standard Plans Book issued May 2006, General Road Work Section.

PART 2 - PRODUCTS

2.1 PAVING MATERIALS

A. Aggregate Base: Aggregate base shall conform to Caltrans Class 2 (R value 78 min) aggregate base, 3/4" maximum size, as specified in Section 26 of the C.D.T. Standard Specifications.

B. Asphalt Concrete Paving:
1. Paving asphalt to be mixed with aggregate shall be steam-refined asphalt, AR-4000, conforming to Section 92 of the C.D.T. Standard Specifications.
2. Mineral aggregate shall be Type B mineral aggregate as specified in Section 39 of the C.D.T. Standard Specifications.
3. Maximum aggregate size shall be as follows:

A.C. Thickness	Max. Ag.
a. ¾" - 1½	1/2"
b. 2 & 2½"	1/2"
c. 3" & 4"	3/4"

4. Liquid asphalt for prime coat shall be Grade SC-70 in conformance with Section 93 of the C.D.T. Standard Specifications.
5. Asphaltic emulsion for paint binder, fog coat, and seal coat shall be emulsified asphalt, Type SS-1h, conforming to Section 94 of the C.D.T. Standard Specifications.

C. Portland Cement Concrete:
1. Concrete shall be Class A concrete conforming to Section 90 of the C.D.T. Standard Specifications.
2. Cement shall be Type II cement conforming to ASTM C150 as modified by Section 90 of the C.D.T. Standard Specifications.
3. Aggregate shall be 3/4-inch maximum size conforming to Section 90 of the C.D.T. Standard Specifications.
4. Water shall be potable and free of organic matter and injurious amounts of oil, acid, alkali, or other deleterious substances.
5. Reinforcing bars shall be deformed and shall conform to ASTM A615.
6. Filled joints, unless noted otherwise on the Drawings, shall be 1/4-inch thick, the full depth of the concrete section and conforming to Section 51 of the C.D.T. Standard Specifications.
7. Joint filler shall conform to Section 51 of the C.D.T. Standard Specifications for pre-molded expansion joint filler and expanded polystyrene joint filler.
8. No admixtures will be allowed without prior approval of the Project Manager.

D. Pavement Reinforcement Fabric: Pavement reinforcement fabric shall meet Caltrans Section 88-1.02, BP Petromat or approved equivalent.

E. Crack Sealant:
1. Crack sealant shall be rubberized hot-pour type and shall meet ASTM D 3405, Husky 1611 or approved equivalent.
2. Blotting Agent shall be one of: Screened sand, cement, or fly ash.

F. Tack coat: Tack coat shall meet Caltrans Section 39-4.02.

G. Pavement reinforcement mesh: Pavement reinforcement mesh for use in Type 2 Overlay shall be Glasgrid Model 8501 or approved equivalent.

H. Structural geotextile fabric: Structural geotextile fabric shall be Mirafi 500X or approved equivalent.

PART 3 - EXECUTION

3.1 PREPARATION

A. Subgrade and Aggregate Base:
1. Prepare a subgrade and over excavation paragraph reference 3.4 of Section 31 00 00-EARTHWORK AND GRADING.

2. Aggregate base shall be compacted to 95 percent ASTM D1557. Sections 26-1.04B and 26-1.05 of the C.D.T. Standard Specifications shall apply.
3. Soil sterilant shall be applied to prepared subgrade or after installation of rock or aggregate base uniformly at the rate recommended by the manufacturer.

B. Crack Sealing:

1. Before sealing, cracks shall be cleared of dirt, dust, and all other deleterious materials to a depth of 1/4-inch to 1/2-inch.
2. Cracks 1/8-inch in width and greater shall be sealed.
3. Application of crack sealer shall be in accordance with the manufacturer's recommendations unless otherwise directed.

3.2 ASPHALT CONCRETE PAVING

A. General:

1. Asphalt concrete shall be proportioned, mixed, placed, spread, and compacted in conformance with Section 39 of the C.D.T. Standard Specifications.
2. Before placing asphalt concrete on untreated base, a liquid asphalt prime coat shall be applied to the base course in conformance with Section 39 of the C.D.T. Standard Specifications. Prime coat shall be applied at the rate of 0.25 gallons per square yard.
3. Before placing asphalt concrete, an asphalt emulsion tack coat shall be applied to all vertical surfaces of existing pavement, curbs, gutters, construction joints, and all existing pavement to be surfaced, in conformance with Section 39 of the C.D.T. Standard Specifications.
4. Spreading and compacting asphalt concrete shall be performed in accordance with Section 39 of the C.D.T. Standard Specifications.
5. Fog seal shall be applied to all finished surfaces of asphalt concrete pavement at a rate of 0.05 gallons per square yard, in accordance with Section 37 of the C.D.T. Standard Specifications.
6. After fog seal has been applied, ample time shall be allowed for drying before traffic is allowed on the pavement or paint striping is applied.

3.3 CONCRETE CONSTRUCTION

A. General:

1. All concrete shall be mixed in accordance with applicable provisions of Section 90 of the C.D.T. Standards Specifications.
2. Construction of concrete substructures shall conform to applicable provisions of Section 51 of the C.D.T. Standard Specifications. Unless noted otherwise in the Specifications, all exposed surfaces of structure shall have Class 1 surface finish or finished to match existing adjacent paving.
5. No pigment shall be used in curing compounds for construction of concrete curbs, gutters, and structures.
6. All work shall be subject to field inspection. No concrete shall be placed until the Project Manager has approved the forms and reinforcement.
7. Expansion joints on curbs and gutters shall be placed 20 feet on centers, adjacent to structures, and at all returns, and shall be filled with joint filler. Control joints shall be formed 10 feet on centers. The score shall 1-inch deep minimum.
8. Concrete shall not be dropped freely where reinforcing bars will cause segregation, nor shall it be dropped freely more than 6 feet. Spouts, elephant trunks, or other approved means shall be used to prevent segregation.

3.4 FIELD QUALITY CONTROL

A. Asphalt Concrete Paving:

1. The specified thickness of the finished pavement shall be the minimum acceptable.
2. Conforms shall form a smooth, pond-free transition between existing and new pavement.
3. Depressions in paving between high spots are not to exceed 1/8-inch when measured below a 10 feet long straight edged placed anywhere on surface in any direction.
4. The finished asphalt pavement shall have positive drainage without ponding.

3.6 CLEANUP

A. General:

1. Surplus material remaining upon completion of paving operations shall become the property of the Contractor, to be removed from the work site and disposed of in a lawful manner.

2. Surfaces shall be left in a clean, neat, and workmanlike condition, and all construction waste, rubbish, and debris shall be removed from the work site and disposed of in a lawful manner.

End of Document

Section 32 17 23
PAVEMENT MARKING

PART 1 – GENERAL
1.1 SUMMARY:

A. Provide requirements for materials, fabrications, and installation of traffic control and pavement markings.

1.2 SUBMITTALS:

A. Submit manufacturer's product data describing application of products and compliance with VOC requirements.

B. Shop Drawings: Show complete layout and location of pavement markings prior to demolition or obliteration of the existing markings.

C. Submit samples as follows:
1. Traffic paint.
2. Pavement markers and adhesives.
3. Reflectorized markers and posts.

1.3 DELIVERY, STORAGE AND HANDLING:

A. Comply with Division 1 requirements, specifications, and the Project Manager.

B. Deliver and store packaged products in original containers with seals unbroken and labels intact until time of installation.

C. Provide proper facilities for handling and storage of products to prevent damage. Where necessary, stack products off ground on level platform, fully protected from weather.

PART 2 – PRODUCTS
2.1 MATERIALS:

A. Traffic Marking and Symbol Paint: Water-Born, Fast-Dry, Traffic Paint distributed by Fuller-O'Brien Corp. D.J. Simpson (#108-273, White); (#108-280, Blue); or approved equivalent.

B. Handicapped Symbol Background Paint: Blue Color. Glidden Co. "Glid-Guard Lifemaster Finish No. 5200 /series, Color 1/M 79", or approved equivalent.

C. Thermoplastic Stripes and Markings:
4. Thermoplastic stripes and makings shall be hot applied conforming to CSS Section 84 and shall be Cataphote-Catatherm brand, Pavemark thermoplastic brand, or approved equal.
5. Thermoplastic stripes and markings shall have a minimum skid friction value of BPN 35.

D. Pavement Markers and Adhesives:
6. Fire hydrant pavement markers shall be two-way retroflective "Blue" markers and shall conform to the applicable requirements of CSS Section 85.
7. Adhesive for pavement markers shall be standard set epoxy adhesive conforming to the requirements of CSS Section 95-2.05.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Examine receiving surfaces and verify that surfaces are clean and proper for installation.

B. Do not start work until unsatisfactory conditions have been corrected.

3.2. APPLICATION:

A. Preparation:
1. Clean and prepare surfaces to receive traffic paint in accordance with CSS Section 84-3.05 and these special provisions. Where required, remove existing striping and markings by wet blasting or equivalent method. Do not use dry sandblasting or other dust producing methods.

B. Traffic Paint:
1. Traffic paint shall be machine applied in accordance with CSS Section 84-3.04.

C. Striping Layout:
1. Traffic stripe shall be single and double, solid and broken, and of the color to match existing conditions.
2. Traffic striping shall be placed in patterns to match existing conditions, contractor shall document.

D. Thermoplastic Stripes and Markings:
1. Thermoplastic stripes and markings shall be applied hot in conformance with manufacturer's recommended instructions and the applicable requirements of CSS Section 84-2.06.

E. Pavement Markers:
1. Blue pavement markers shall be installed to delineate the location of fire hydrants along campus roads or as shown on plans. No markers shall be installed until the surface has been approved by the Project Manager and until at least 10 days after the slurry seal on asphalt concrete has been placed. Place markers in accordance with CSS Section 85-1.06.

F. Apply marking paint in accordance with approved manufacturer's recommendations.

G. Density of paint coverage shall hide color and texture of substate.

H. Parking Stripes: Paint four inches wide unless otherwise noted.

I. Symbol Marking: Paint to match existing conditions.

3.3 CLEANING AND PROTECTION:

A. Comply with requirements of Section CLEANING.

B. Upon completion of work, remove surplus materials and rubbish and clean off spilled or splattered paint resulting from this work.

C. Permit no surface traffic until pavement and symbol marking has dried thoroughly.

End of Document

SECTION 32 32 13

PORTLAND CEMENT CONCRETE RETAINING WALLS

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes general requirements, products, and methods of execution relating to on-site Portland Cement Concrete Retaining Walls, unless otherwise noted:

1. Concrete mix design.
2. Formwork.
3. Reinforcement.
4. Removal of unused concrete and materials.

B. Contractor shall provide all labor, equipment, materials, and testing services unless otherwise noted.

C. Related Sections:

1. Section 31 10 00 - SITE PREPARATION.
2. Section 31 23 33 – TRENCHING, BACKFILLING, & COMPACTING.

1.2 SUBMITTALS

A. Comply with requirements of Section 01 33 00 SUBMITTALS.

B. Submit product data for proprietary materials and items, admixtures, joint systems, curing compounds, dry-shake finish materials, and others if requested by District.

C. Submit design mixes for each class of concrete. Include revised mix proportions when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

D. Submit laboratory test reports for evaluation of concrete materials and mix design tests.

E. Provide material certificates in lieu of material laboratory test reports when permitted by Architect.

1. Provide material certificates signed by manufacturer and Contractor certifying that each material item complies with or exceeds requirements.
2. Provide certification from admixture manufacturers that chloride content complies with requirements.

F. Shop Drawings: Submit shop drawings showing elevations, control joint layout, finish, and rebar schedule.

1.3 QUALITY ASSURANCE

A. Comply with latest edition of the following standards and regulations:

1. American Society for Testing and Materials (ASTM).
2. California Department of Transportation (CALTRANS) Standard Plans (CSP) and Standard Specifications (CSS).
3. American Concrete Institute (ACI).
4. Local requirements where they are applicable.

B. Prevent damage to adjacent concrete curbs, walks, utilities, walls, etc., during installation.

1. Repair any damage to concrete edges or breaks in concrete at no cost to the District, by removal and replacement of complete sections.
2. Patching will not be acceptable.

C. The sequence of operations shall be reviewed by the District's Representative prior to commencement of any work.

1.4 SITE CONDITIONS

A. Submit to District in writing any discrepancy between existing conditions and the Contract Documents.

B. Commencement of any part of the work shall constitute acceptance of existing site conditions as satisfactory.

C. Provide protection of materials if required by weather conditions so as not to compromise the quality of work.

D. Provide protection of surfaces adjacent to work.

E. Traffic Control: Maintain access for vehicular and pedestrian traffic as required by District.

PART 2 - PRODUCTS

2.1 CONCRETE

A. Provide concrete materials conforming to the applicable requirements for Portland Cement Concrete as specified in CSS Section 90 Portland Cement Concrete (P.C.C.) for ASTM Type II P.C.C., Class 1 Concrete.

1. Concrete shall not contain less than 675 lb of Portland cement per cubic yard.
2. Concrete shall have a 4000 psi, 28-day compressive strength.
3. Concrete shall have a water-cement ratio of 0.44 maximum (non-air-entrained), or 0.35 maximum (air-entrained).
4. Mix design adjustments may be requested when materials, job conditions,

weather, test results, or other circumstances warrant adjustment. Laboratory tests must be submitted to and accepted by the District's representative before using in work.

B. Aggregate for normal weight concrete shall be free of deleterious material and conform to CSS Section 90-3.04, 1 inch maximum grading.

1. Coarse Aggregate shall conform to CSS Section 90-2.02A.
2. Fine Aggregate shall conform to CSS Section 90-2.02B.

C. Water: Water shall be clean and potable.

D. Admixtures: Admixtures may be used with approval of the Engineer. If more than one admixture is used, Contractor shall certify that all admixtures are compatible. Admixtures shall conform to CSS Section 90-4.

E. Slump Limit: Slump shall be not less than 1 inch and not more than 4 inches.

F. Patching Mortar: Mortar shall conform to CSS Section 51-1.135. Color shall match surrounding concrete.

G. Grout: Non Shrink Grout shall be factory pre-mixed conforming to ASTM C1107, Grade B, capable of developing 2400 psi in 48 hours, 7000 psi in 28 days.

2.2 FORMS

A. General: Provide forms of wood or steel, straight and of sufficient strength and stiffness to resist springing during depositing and consolidating concrete, of a height equal to the full depth of the finished concrete, and conforming to CSS Section 51.105 Forms, unless otherwise specified.

B. Wood forms:

1. Use minimum 5/8-inch thick plywood complying with U.S. Product Standard PS 1 for s for Concrete Form plywood for exposed surfaces.
2. Wood forms for exposed surfaces shall be straight and free from warp, twist, loose knots, splits or other defects.
3. Wood forms for unexposed surfaces shall be of sufficient strength and stiffness to hold concrete properly in place.

C. Steel forms:

1. Provide channel-formed sections with a flat top surface and with welded braces at each end and at not less than 2 intermediate points.
2. Form ends shall be interlocked and self-aligning.
3. Forms shall include flexible forms for radius forming, corner forms, form spreaders, and fillers.
4. Stake pins shall be solid steel rods with chamfered heads and pointed tips, designed for use with steel forms.

D. Form ties: Form ties shall be snap-off metal of fixed length, leaving no metal within 1-1/2 inch of surface and no fractures or other surface defects larger than 1 inch in diameter. Manufactured by Burke, Dayton, or approved equivalent.

E. Chamfer strips: Chamfer strips shall be rigid PVC, 3/4 inch x 3/4 inch or 1 inch x 1 inch size, as indicated on the Plans.

F. Form release agent: Form release agent shall be a colorless, non-staining agent, free from oils, that shall not impair bonding of paint or other coatings.

2.3 OTHER MATERIALS

A. Concrete Curing Material:

1. Burlap: Conforming to AASHTO M182 with a weight of 14 ounces or more per square yard when dry.
2. Impervious Sheeting: Comply with ASTM C171.
3. Liquid Membrane Curing Compound: Comply with ASTM C309. Provide curing compound free of paraffin or petroleum.

B Expansion Joint Fillers: Comply with ASTM D1751 or provide a resin-impregnated fiberboard conforming to the physical requirements of ASTM D1752.

C. Reinforcement: Provide dowels, reinforcement bars and welded wire mesh conforming to the requirements in CSS Section 52, Reinforcement, as required in the Plans.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the surfaces and areas at the locations for the retaining walls to establish acceptable conditions.

1. Examine areas where formwork will be constructed and verify that:
   a. The excavations are sufficient to permit placement, inspection, and removal of forms.
   b. The excavations for earth forms have been neatly and accurately cut.
   c. Conditions are otherwise proper for formwork construction.
2. Verify that formwork is complete.
3. Verify that the excavation is free of debris and excess water.

B. Coordinate size and location of openings and penetrations in the concrete.

C. Coordinate location of items to be embedded into the concrete.

D. If unsuitable conditions are found, immediately notify the District's Representative in writing, indicating the nature and extent of the unsuitable conditions.

E. Do not begin installation until defects have been corrected.

3.2 SUBGRADE PREPARATION

A. Remove material deflecting more than 1/2 inch under the roller to a depth of 4 inches. below subgrade elevation and replace with an approved granular material.

1. Compact new material as specified in Section 31 23 33 – TRENCHING, BACKFILLING, & COMPACTING, or as shown in the Construction Documents.
2. Test completed subgrade for grade and cross section with a template extending the full width of the footing and supported between side forms.
3. Provide subgrade of materials equal in bearing quality to the subgrade under the adjacent pavement.
4. Place and compact additional subgrade material as needed.

B. Maintenance of Subgrade:

1. Maintain subgrade in a smooth, compacted condition, in conformity with the required section until the concrete is placed.
2. Prepare and protect subgrade so as to produce a subgrade free from frost and excessive moisture when the concrete is deposited.

3.3 FORM SETTING

A. Construct formwork to produce concrete surfaces to the tolerances of ACI 301.

B. Provide temporary ports in formwork to facilitate cleaning and inspections. Locate openings at the bottom or forms to allow flushing water to drain. Close ports with tight-fitting panels, flush with the inside face of the forms, neatly fitted so that joints will not be apparent in exposed concrete surfaces.

C. Provide chamfer strips on external corners of walls.

D. At exposed surfaces, keep the number of panel joints to a practical minimum. Insure vertical joints are plumb and horizontal joints are level.

E. After forms are set, check grade and alignment with a 10-foot straightedge.

1. Forms shall conform to line and grade with an allowable tolerance of 1/4 inch in any 10-foot long section.
2. Forms shall have a transverse slope with the low side adjacent to the roadway unless otherwise indicated on Drawings.

F. Form release agent:

1. Apply a coating of form release agent immediately before use, but prior to installation of reinforcing steel and embedded items.
2. Do not apply agent where concrete surfaces are scheduled to receive special finishes which may be affected by the agent.
3. Soak contact surfaces of untreated forms with clean water.

G. Embedded parts and openings:

1. Provide formed openings for work passing through concrete where indicated on Electrical drawings.
2. Do not install sleeves or openings, except as indicated on the Plans, without approval of the Engineer.
3. Properly locate and place inserts and embedded items required by work prior to casting concrete.

H. Expansion Joints:

1. Provide expansion joints and isolation joints where shown or noted on the Plans.
2. Provide sealed joints where concrete surface remains exposed to view or at conditions with non-bituminous or liquid waterproofing, unless otherwise shown or noted.
3. Place joint filler in straight line with edge held back to specified dimension from finish surface and secure to formwork or previously placed construction.
4. Use fiber type joints typically and hold edge back 1/4 inch from concrete surface.
5. Use cork type joint fillers at sealed joints and hold edge back 1/2 inch.
6. After curing concrete, carefully clean, prime and fill joints with sealant to 1/4 inch from the finished surface in accordance with manufacturer's recommendations.

I. Do not remove side forms within 12 hours after finishing has been completed.

3.4 EARTH FORMS

A. Footing forms may be omitted and foundation concrete may be placed directly into neatly and accurately cut excavations, provided that the walls are stable as determined by the Geotechnical Engineer, subject to approval by the Engineer.

B. Where sides are deemed unstable or excavations are not accurately cut to tolerances of ACI 301, construct forms to the extent required.

C. Remove loose dirt prior to placing concrete.

3.5 FORM REMOVAL

A. Do not remove forms until concrete has hardened and attained sufficient strength to permit safe removal and adequate support of adjacent loads.

B. Remove forms carefully to avoid damaging corners and edges of exposed concrete. Prying against the face of concrete is not allowed.

C. Curing, where forms are removed in less than 14 days, shall be continued as follows:

1. Wet down concrete immediately after stripping.

2. Apply curing compound as soon as areas are surface dry.

D. After concrete is placed, forms and shores shall remain in place for not less than 7 days for wall forms and 3 days for side forms of slabs and foundations.

3.6 REUSE OF FORMS

A. The District's Representative will approve reuse of forms. Forms shall be straight, clean, free from nails, hardened concrete, and other deleterious matter. Edges and surfaces should be in good condition.

B. Clean and repair all damage caused by placing, removal, or storage. Reuse of formwork with patches or repairs that could affect the exposed concrete finish will not be permitted.

C. Forms shall not be reused for Architectural Concrete if there is any evidence of surface damage or defect which could affect the quality of the surface.

D. Reseal form faces as required to achieve concrete of specified quality.

3.7 REINFORCEMENT PLACEMENT

A. Place bars at locations shown on the Plans, maintaining minimum cover, to the following tolerances:

1. Clear distance to formed surfaces: Plus or minus 1/4 inch.
2. Top bars in slabs 8 inches deep or less: Plus or minus 1/4 inch.
3. Tops bars in beams and slabs over 8 inches deep: Plus 1/4 inch and minus 1/2 inch.
4. Bar Spacing: Plus or minus one inch, but not less than minimum spacing.
5. Ends of Bars: Plus or minus 2 inches, except plus or minus 1/2 inch at discontinuous ends.

B. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports, and as herein specified.

C. Clean reinforcement of loose rust and mill scale, earth, ice, and other bond-reducing materials.

D. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers.

E. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations.

F. Place reinforcement to obtain at least minimum coverage for concrete protection.

1. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations.
2. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

G. Reinforcement to be welded shall conform to requirement of American Welding Society Specifications, AWS D12.1.

1. If mill test reports are not available, chemical analysis shall be made of bars representative of the bars to be welded.
2. ASTM A706 bars may be assumed to have a carbon equivalent (C.E.) not exceeding 0.55. Bars with a C.E. above 0.75 shall not be welded.
3. Welding shall not be done on or within two bar diameters of any bent portion of a bar which has been bent cold.
4. Welding of crossing bars shall not be permitted for assembly of reinforcement unless authorized by the Structural Engineer of Record and approved by the Inspector of Record.
5. Welding is not permitted unless specifically detailed on plans or approved by Architect.

H. Splicing: Make splices only at those locations shown on the Plans or as accepted by the Owner's Representative. Stagger splices in adjacent bars wherever possible.

I. Dowels: Dowels shall be tied securely in place before concrete is deposited. In the event there are no bars in position to which dowel may be tied, No. 3 bars (minimum) shall be added to provide proper support and anchorage.

J. Install deformed bar anchors in accordance with the manufacturer's recommendations.

K. Install mechanical splices and reinforcing couplers in accordance with manufacturer's recommendations.

L. Reinforcement shall not be bent after being embedded in hardened concrete.

M. Protection Against Rust

1. Where there is danger of rust staining adjacent surfaces, wrap reinforcement with impervious tape or otherwise prevent rust staining.
2. Remove protective materials and clean reinforcement as required before proceeding with concrete placement.

3.8 CONCRETE PLACEMENT

A. Placing Record: Record time, date and location of concrete placement; maintain record open to inspection by the Inspector-of-Record.

B. Place concrete in accordance with ACI 301, or CSS Section 51-1.09 Placing Concrete.

C. Convey concrete as rapidly and directly as practicable to preserve quality and to prevent separation.

1. Do not deposit concrete which has initially set.
2. Retempering of concrete which has partially set will not be permitted.

D. The free vertical drop of the concrete deposited at any point in forms during conveying shall not exceed 3 feet. Chutes may be issued only where they discharge into a hopper before distribution.

E. Deposit concrete in a continuous operation to permit proper and thorough integration.

1. Carry work started in a section continuously to construction joint.
2. Place concrete at rate and in such manner that concrete surfaces not carried to joint levels will not attain initial set before additional concrete is placed.
3. Use equipment that will permit the concrete to be placed in a manner that will prevent segregation and accumulations or hardened concrete above the level of the concrete.

F. Keep forms and reinforcement clean above pour line by removing clinging concrete.

G. Cold Weather Placement: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing, or low temperatures, in compliance with ACI 306 and as herein specified.

1. When air temperature has fallen to or is expected to generally fall below 40 degrees F (4 degrees C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C), and not more than 80 degrees F (27 degrees C) at point of placement.
2. Thin upper level slabs should obtain a concrete mixture temperature of not less than 55 degrees F (13 degrees C).
3. Do not use frozen materials or materials containing ice or snow.
4. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
5. Do not use calcium chloride, salt and other mineral containing anti-freeze agents or chemical accelerators, unless otherwise accepted by Architect.

H. Hot Weather Placement: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F (32 degrees C). Mixing water may be chilled, or chopped ice may be used to control concrete temperature provided water equivalent of ice is calculated to total amount of mixing water.
2. Place concrete immediately upon delivery. Keep exposed concrete surfaces, and formed shaft extensions, moist by fog sprays, wet burlap or other effective means.
3. Do not use retarding admixtures without acceptance of Architect.

I. Consolidation:

1. Use internal vibrators for thorough consolidation of all concrete, in compliance with ACI 309 and as herein specified. Use largest size and most powerful vibrators that can be accommodated in the work.
2. Do not place vibrators against reinforcement, attach to forms, or use to spread concrete.
3. Exposed Concrete: Vibrate with rubber type heads and spade along forms with flat strap or plate.
4. Architectural Concrete:
   a. Proper placement and thorough compaction of architectural concrete are critical.
   b. Place vibrators in the concrete rapidly to minimize entrapped air between the concrete and the form and to blend the two layers.
   c. Insert vibrators in accordance with manufacturer's recommended radius of influence.
   d. Use a minimum of three 180-cycle motor-in-head vibrators for concrete placing. Minimum frequency 9,000 impulses per minute, minimum head diameter 1-1/2 inches.
5. Keep vibrator heads a minimum of 2-1/2 inches from the architectural concrete face.
6. If, during the placing operation, there is any delay of more than 15 minutes, the previous lift will be manipulated with the vibrators just prior to the placement of fresh concrete.

3.9 FINISHING

A. Finish of formed surfaces to be smooth and free of fins, honeycomb, or segregation. When defects occur, they are to be remedied by chipping cavities and patching, or by other methods approved by Owner.

B. Exposed surfaces to be “sacked” by rubbing cement mortar into voids with burlap or canvas. Fins to be ground smooth and loose mortar to be removed.

C. Vertical edges of the walls to have 3/4-inch chamfer.

D. Horizontal edges of the walls to have ½-inch chamfer.

E. Unformed surfaces to be steel troweled to a smooth dense finish. After the trowel finish has sufficiently hardened, walking surfaces of the entire surface to be given a medium broom finish perpendicular to the direction of travel. The broom finish to be applied just prior to the application of the curing compound/sealer.

3.10 CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperature in accordance with ACI 308 and as specified herein.

1. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing concrete. Weather permitting, keep continuously moist for not less than 7 days.

2. Begin final curing procedures immediately following initial curing and before concrete has dried.
3. Continue final curing for at least 7 days in accordance with ACI 301 procedures.
4. Avoid rapid drying at end of final curing period.

B. Curing Methods: Perform curing of concrete by moist curing (Mat Method), by moisture-retaining cover curing (Impervious Sheeting Method), by curing compound (Membrane Curing Method), or by combinations thereof.

1. Mat Method: Provide moist curing by any of the following methods to keep concrete surface continuously wet:

C. Cover concrete continuously with water.

D. Provide a continuous water fog spray.

E. Cover concrete with a saturated absorptive mat. Prior to placing mats on concrete surface, thoroughly wet the exposed surface with water. Cover the entire exposed surface with 2 or more layers of burlap. Mats shall overlap each other at least 6 inches. Continuously keep mats in a saturated condition and in intimate contact with concrete for not less than 7 days.

F. Impervious Sheeting Method: Provide moisture-cover curing as follows:

1. Wet the entire exposed surface with a fine spray of water and then cover with impervious sheeting material.
2. Lay sheets directly on the concrete surface, placed in widest practicable width with sides and ends lapped at least 12 inches when a continuous sheet is not used.
3. Provide impervious sheeting at least 18 inches wider than the concrete surface to be cured.
4. Securely weigh sheeting down with heavy wood planks, or by placing a bank of moist earth along edges and laps in the sheets, or by sealing with waterproof tape or adhesive.
5. Immediately repair any holes or tears in cover during curing period using cover material and waterproof tape.
6. Sheets shall be satisfactorily repaired or replaced if torn or otherwise damaged during curing.
   a. The curing sheet shall remain on the concrete surface to be cured for not less than 7 days.

G. Membrane Curing Method: Provide curing compound to slabs as follows:

1. Cover the entire exposed surface with a membrane-forming curing compound.
2. Apply specified curing and sealing compound as soon as final finishing operations are complete (within 2 hours).
3. Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions, or apply in 2 coats by hand-operated pressure sprayers as recommended by the manufacturer.
4. Apply an additional coat to all surfaces showing discontinuity, pinholes or other defects.
5. Recoat areas subjected to heavy rainfall within 3 hours after initial application.
6. Maintain continuity of coating and repair damage during curing period.
7. Protect concrete surfaces to which membrane-curing compounds have been applied.
8. Any area covered with curing compound and damaged by subsequent construction operations within the 7-day curing period shall be resprayed.

H. Do not use membrane curing compounds on concrete surfaces which are to be covered with material applied directly to concrete, such as liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring, painting, and other coatings and finish materials, unless otherwise acceptable to Engineer.

3.11 CONSTRUCTION JOINTS

A. General: Construction joints shall conform to typical details and be located where shown on the Plans or where approved by the Engineer. Locate joints to minimize impairment to the strength of the structure.

B. Place construction joints perpendicular to the main reinforcement. Continue reinforcement across construction joints.

C. Walls: To assure a level and straight joint in exposed vertical surfaces, tack a 3/4 inch x 1-1/4 inch strip of dressed lumber to exposed face form at construction joint.

1. Place concrete 1 inch above underside of strip.
2. During stripping, carefully remove tack strip to prevent chipping or spalling.
3. Maximum spacing between vertical construction joints shall be 60 feet.

D. Provide keyways at least 1½-inches deep in construction joints in walls and slabs, unless shown otherwise. Bulkheads designed for this purpose may be used for slabs if approved by Architect.

3.12 CONTRACTION (CONTROL) JOINTS

A. Provide joints of size and at locations specified below:

1. Provide ¾” Chamfer joints at 20 feet maximum spacing in each direction, unless otherwise shown or noted.

B. Sawcut as soon as concrete has hardened sufficiently to prevent aggregates being dislodged by saw. Complete sawcutting operations within 24 hours of the introduction of water to the mix.

3.14 REPAIR OF DEFECTIVE WORK

A. Where concrete is under strength, out of line, level or plumb, or shows objectionable cracks, honeycombing, rock pockets, voids, spalling, exposed reinforcement, or is otherwise defective, and in the Engineers's judgment, these defects impair the proper strength or appearance of the work, the Engineer will require its removal and replacement at the Contractor's expense.

B. Immediately after stripping and before concrete is thoroughly dry, patch minor defects, form-tie holes, honeycombed areas with patches that match finish of adjacent surface.

1. Tie holes shall be filled solid with patching mortar.
2. Cut out honeycombed or otherwise defective areas to solid concrete to a depth of not less than 1 inch.
3. The edges of the cut shall be perpendicular to the surface of the concrete.
4. Saturate the area to be patched and at least 6 inches adjacent thereto with water before placing the mortar.
5. Mix the mortar approximately 1 hour before placing and remix occasionally during this period with a trowel without the addition of water.
6. A grout of cement and water mixed to the consistency of paint shall then be brushed on to the surfaces to which the mortar is to be bonded.
7. Compact the mortar into place and screed slightly higher than the surrounding surface.
8. Finish patches on exposed surfaces to match the adjoining surfaces, after they have set for an hour or more.
9. Cure patches as specified for the concrete.

C. The specified patching mortar may be used in lieu of the above method when color match of the adjacent concrete is not required. Prior approval by the Engineer is required.

D. All structural repairs shall be made with prior approval of the Engineer of Record, as to method and procedure, using the specified epoxy adhesive and/or epoxy mortar. Where epoxy injection procedures must be used, an approved low viscosity epoxy made by the manufacturers previously specified shall be used.

3.15 FIELD QUALITY CONTROL

A. Comply with requirements of Section 01 45 23 - TESTING AND INSPECTION SERVICES.

B. The Owner's Testing Agency will:

1. Provide full time special inspection for concrete placement.
2. Inspect concrete placement for conformance with the Contract Documents in accordance with the California Building Code.

C. Sampling Fresh Concrete: Samples for strength tests shall be taken in accordance with ASTM C172. Cylinders and cores for acceptance shall be made, cured and tested in accordance with ASTM C31 and ASTM C39.

1. Slump: ASTM C 143; one test for each concrete load at point of discharge; and one test for each set of compressive strength test specimens.
2. Air Content: Air content tests shall be made each time compressive strength cylinders are taken of concrete required to be air entrained.
3. Compression Test Specimen: One set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
4. Compressive Strength Tests: One set for each 10 cubic yards or fraction thereof, of each concrete type and strength placed in any one day, 1 specimen tested at 7 days, 2 specimens tested at 28 days, and 1 specimen retained in reserve for later testing if required. Compressive strength tests are not required for exterior concrete paving.
5. When frequency of testing will provide less than 5 tests for a given type and strength of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
6. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
7. Strength level of concrete will be considered satisfactory if averages of sets of two consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified 28 day compressive strength by more than 500 psi.

D. Structural Grout for Horizontal Joints: Verify that required mixing procedures are taken. One set of four samples will be taken for compression tests for each day grouting takes place. Observe initial grout placement and conduct periodic visual inspections of in-place work.

E. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Engineer.

1. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.
2. Owner shall back charge the Contractor for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

3.16 BACKFILL

A. After curing, remove debris; backfill, grade and compact the area adjoining the concrete to conform to the surrounding area in accordance with lines and grades indicated.

3.17 CLEANING

A. Comply with requirements of Section 01 71 00 - CLEANING.

B. Protect completed concrete from damage until accepted.

C. Repair damaged concrete and clean concrete discolored during construction.

1. Concrete that is damaged shall be removed and reconstructed for the entire length between regularly scheduled joints.
2. Refinishing the damaged portion will not be acceptable.
3. Remove damaged portions and dispose of as directed.

D. Ensure removal of bituminous materials, form release agents, bond breakers, curing compounds or other materials employed in work of concreting which would otherwise prevent proper application of sealants, liquid waterproofing, or other delayed finishes or treatments.

E. Where cleaning is required, take care not to damage surrounding surfaces or leave residue from cleaning agents.

END OF SECTION

Section 32 50 00
RESTORATION OF SURFACES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes but is not limited to:

1. General surface restoration.
2. Asphalt concrete surface restoration.
3. Concrete surface restoration.
4. Pavement Marking
5. Landscape/Planting restoration.

B. Related Sections:

1. Section 02315 - TRENCHING, BACKFILLING & COMPACTING.
2. Section 02750 - PAVING AND SURFACING.
3. Section 02780 – PAVEMENT MARKING.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Refer to Section 31 23 33 - TRENCHING, BACKFILLING & COMPACTING.
Refer to Section 31 12 23 - PAVING AND SURFACING.
Refer to Section 32 17 23 – PAVEMENT MARKING.

PART 3 - EXECUTION

3.1 GENERAL

A. Surface restoration shall be in kind or better.

3.2 ASPHALT CONCRETE SURFACE RESTORATION

A. The base course for permanent asphalt concrete surface restoration shall be Class II Aggregate Base, equal in depth to the existing pavement structural section, but not less than 8 inches in depth.

B. The wearing surface for permanent surface restoration on improved streets shall be asphalt concrete equal in thickness to the existing pavement, but not less than 3 inches in depth. The asphalt concrete shall be Type B Asphalt Concrete, in accordance with Section 32 12 23 - PAVING AND SURFACING.

3.3 CONCRETE SURFACE RESTORATION

A. The base for permanent concrete surface restoration shall be Class II Aggregate base, equal in depth to the existing section, but not less than 6 inches in depth.

B. The weaving surface for permanent concrete surface restoration shall be concrete equal in thickness to the existing concrete section, but not less than 4 inches in depth for Pedestrian Areas and not less than 6 inches in depth for Vehicular areas. The concrete shall be 6-sack concrete, in accordance with Section 32 12 33 – PAVING AND SURFACING.

3.4 PAVEMENT MARKING RESTORATION

A. Replace pavement marking disturbed by construction operations/activity to the satisfaction of the Project Manager in kind in accordance with Section 31 17 23 – PAVEMENT MARKING.

3.5 LANDSCAPE RESTORATION

A. Replace landscaping, planting, trees, shrubs, ground cover, irrigations systems disturbed by construction operations/activity to the satisfaction of the Project Manager in kind or better.

B. Disturbed lawn areas shall be replace with Sod in kind or better to the satisfaction of the Project Manager.

END OF SECTION

Section 33 10 00
WATER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes general requirements, products, and methods of execution relating to on-site domestic water and fire water systems serving all buildings and appurtenances. Unless otherwise noted, this section does not apply to irrigation water systems and water systems inside and within 5 feet of buildings. This section applies to:

1. Domestic water distribution and services.
2. Fire water distribution and services.
3. Water storage tanks.
4. Booster pumps.

B. Contractor shall provide all labor, equipment, materials, and testing services unless otherwise noted.

C. Related Sections:

1. Section 31 23 33 – TRENCHING, BACKFILLING AND COMPACTING.

1.2 SUBMITTALS

A. Comply with requirements of Section 01330 – SUBMITTAL PROCEDURES.

B. Product Data: Manufacturer's literature and data, including, where applicable, sizes, pressure rating, rated capacity, listing/approval stamps, labels, or other marking on equipment made to the specified standards for materials, and settings of selected models, for the following:

1. Piping and fittings.
2. Gaskets, couplings, sleeves, and assembly bolts and nuts.
3. Gate valves and ball valves.
4. Blow-off valves, air release and vacuum valves, and combination air valves.
5. Check valves.
6. Pressure reducing valves.
7. Backflow preventers.
8. Post indicators.
9. Fire department connections and wet stand pipes.
10. Fire hydrants.
11. Thrust block concrete mix and/or restrained joints and fittings.

12. Tapping sleeves and tapping valves.
13. Service saddles and corporation stops.
14. Identification materials and devices.

C. Shop Plans and Calculations: Where an on-site fire water system is required, Contractor shall provide shop plans for Program Manager and agency approval prior to construction. Coordinate with the Construction Documents and identify any proposed modifications or deviations. Shop Plans and Calculations shall be stamped and signed by a registered Fire Protection Engineer licensed by the State of California as required.

1. Include the following information:
   a. Design assumptions.
   b. Thrust block sizing and calculations.
   c. Materials to be used.
   d. Available water pressure.
   e. Required water pressure.
2. The review of fire system components constitutes only a portion of the review and approval required. A copy of the fire system component submittal package shall be forwarded to the local fire marshal for further review and approval.

D. Test Reports:

1. Water Pressure Report: At the conclusion of work, the Contractor shall engage a qualified testing service to conduct a flow test of the existing campus main(providing flow test data for all mains and at least six (6) hydrants). Provide date and location of test, type and method of test performed, static pressure and residual pressure in psig, observed flow in gpm, and orifice size.

E. Samples: None specified. Provide as necessary.

1.3 QUALITY ASSURANCE

A. Comply with the latest edition of the following Standards and Regulations:

1. American Water Works Association (AWWA) and American National Standards Institute (ANSI):
   a. C104/A21.4 ANSI Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
   b. C105/A21.5 ANSI Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.
   c. C110/A21.10 ANSI Standard for Ductile-Iron and Gray-Iron Fittings, 3 inch - 48 inch for Water.
   d. C111/A21.11 ANSI Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
   e. C115/A21.15 ANSI Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
   f. C116/A21.16 ANSI Standard for Protective Fusion-Bonded Epoxy Coatings Interior & Exterior Surfaces for Ductile-Iron and Gray-Iron Fittings.
   g. C150/A21.50 ANSI Standard for Thickness Design of Ductile-Iron Pipe.
   h. C151/A21.51 ANSI Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.
   i. C153/A21.53 ANSI Standard for Ductile-Iron Compact Fittings for Water Service.
   j. C500 Metal-Seated Gate Valves for Water Supply Service.
   k. C502 Dry-Barrel Fire Hydrants.
   l. C503 Wet-Barrel Fire Hydrants.
   m. C504 Rubber-Seated Butterfly Valves.
   n. C507 Ball Valves, 6 inches - 48 inches.
   o. C508 Swing-Check Valves for Waterworks Service, 2 inches - 24 inches NPS.
   p. C509 Resilient-Seated Gate Valves for Water Supply Service.
   q. C510 Double Check Valve Backflow Prevention Assembly.
   r. C511 Reduced-Pressure Principle Backflow Prevention Assembly.
   s. C512 Air Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.
   t. C550 Protective Epoxy Interior Coating for valves and Hydrants.
   u. C600 Installation of Ductile-Iron Water Mains and their Appurtenances.
   v. C602 Cement- Mortar Living of water Piplines in place- 4 inches and larger.
   w. C605 Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.
   x. C651 Disinfecting Water Mains
   y. C652 Disinfection of Water-Storage Facilities
   z. C800 Underground Service Line Valves and Fittings for 1/2 inches - 2 inches.
   aa. C900 Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 inches - 12 inches, for Water Distribution.
   bb. C901 Polyethylene (PE) Pressure Pipe and Tubing, 1/2 inches through 3 inches, for Water Service.
   cc. C905 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 inches - 48 inches.
   dd. C906 Polyethylene (PE) Pressure Pipe and Fittings, 4 inches - 63 inches, for Water Distribution and Transmission.
   ee. C907 Polyvinyl Chloride (PVC) Pressure Fittings for Water, 4 inches - 8 inches.
   ff. C908 PVC Self-Tapping Saddle Tees for Use on PVC

Pipe.

gg. D103 Factory-Coated Bolted steel Tanks for water Storage.

2. National Fire Protection Association (NFPA):
   a. NFPA 13 Standard for the Installation of Sprinkler Systems.
   b. NFPA 14 Standard for the Installation of Standpipe, Private Hydrants, and Hose Systems.
   c. NFPA 20 Standard for the Installation of Stationary Pumps for Fire Protection.
   d. NFPA 22 Standard for Water Tanks for Private Fire Protection.
   e. NFPA 24 Private Service Mains and their Appurtenances.
   f. NFPA 25 Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.

3. Uni-Bell Plastic Pipe Association (UNI).
   a. PUB 3 PVC Pipe – Technology Serving the Water Industry.
   b. PUB 7 External Corrosion of Underground Water Distribution Piping Systems.
   c. PUB 8 Tapping Guide for AWWA C900 Pressure Pipe.
   d. PUB 9 Installation Guide for PVC Pressure Pipe.
   e. B-8 Recommended Practice for the Direct Tapping of Polyvinyl Chloride (PVC) Pressure Water Pipe (Nominal Diameters 6-12 inch).

4. American Society of Testing and Materials (ASTM).
   a. ASTM A536 Standard Specification for Ductile Iron Castings.
   b. ASTM A674 Standard Practice for Polyethylene Encasement for Ductile Iron Pipe for Water or Other Liquids.
   c. ASTM D1785 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
   d. ASTM D2241 Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe.
   e. ASTM D2466 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
   f. ASTM D2564 Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
   g. ASTM D2683 Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.
   h. ASTM D3139 Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
   i. ASTM D3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
   j. ASTM D3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
   k. ASTM F477 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
   l. ASTM F1055 Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing.
   m. ASTM F1056 Standard Specification for Socket Fusion Tools for Use in Socket Fusion Joining Polyethylene Pipe or Tubing and Fittings.
   n. ASTM A53/A53M Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   o. ASTM A795 Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.
   p. ASTM A865 Standard Specification for Threaded Couplings, Steel, Black or Zinc-Coated (Galvanized) Welded or Seamless, for Use in Steel Pipe Joints.
   q. ASTM B88 Standard Specification for Seamless Copper Water Tube.

5. American Society of Mechanical Engineers (ASME).
   a. ASME B16 series for valves, fittings, flanges, and gaskets applicable for use in water systems.
   b. ASME B1.20.1 American Standard Tapered Pipe Threads for factory-threaded pipe and pipe fittings.

6. National Sanitation Foundation (NSF).
   a. NSF/ANSI 14 Plastics Piping System Components and Related Materials.
   b. NSF/ANSI 61 Standard for Drinking Water Systems Components – Health Effects.

7. Underwriters Laboratories, Inc. (UL).
   a. UL 157 Standard for Safety for Gaskets and Seals.
   b. UL 194 Standard for Safety for Gasketed Joints for Ductile-Iron Pipe and Fittings for Fire Protection Service.
   c. UL 213 Rubber Gasketed Fittings for Fire-Protection Service.
   d. UL 246 Standard for Safety for Hydrants for Fire-Protection Service.
   e. UL 262 Standard for Safety for Gate Valves for Fire-Protection Service.
   f. UL 312 Standard for Safety for Check Valves for Fire-Protection Service.

g. UL 405 Standard for Safety for Fire Department Connections.
h. UL 448 Standard for Safety for Pumps for Fire-Protection Service.
i. UL 789 Standard for Safety for Indicator Posts for Fire-Protection Service.
j. UL 860 Pipe Unions for Flammable and Combustible Fluids and Fire-Protection Service.
k. UL 1091 Standard for Safety for Butterfly Valves for Fire-Protection Service.
l. UL 1285 Pipe and Couplings, Polyvinyl Chloride (PVC), for Underground Fire Service.
m. UL 1468 Direct Acting Pressure Reducing and Pressure Restricting Valves.
n. UL 1478 Standard for Safety for Fire Pump Relief Valves.

8. FM Global (FM).
a. FM 1020 Automatic Water Control Valves.
b. FM 1045 Waterflow Detector Check Valves.
c. FM 1110 Indicator Posts.
d. FM 1111 Post-Indicator-Valve-Assembly.
e. FM 1112 Indicating Butterfly Valves.
f. FM 1120 and FM 1130 Fire Service Water Control Valves (OS&Y and NRS Type Gate Valves).
g. FM 1210 Swing Check Valves.
h. FM 1221 Backflow Preventers (Reduced Pressure Principle and Double Check Valve Types).
i. FM 1311 Centrifugal Fire Pumps (Horizontal, Split-Case Type).
j. FM 1312 Centrifugal Fire Pumps (Vertical-Shaft, Turbine Type).
k. FM 1319 Centrifugal Fire Pumps (Horizontal, End Suction Type).
l. FM 1361 Water Pressure Relief Valve.
m. FM 1362 Pressure Reducing Valves.
n. FM 1371 Centrifugal Fire Pumps (In-Line Type).
o. FM 1510 Fire Hydrants (Dry Barrel Type) for Private Fire Service.
p. FM 1511 Fire Hydrants (Wet Barrel Type) for Private Fire Service.
q. FM 1530 Fire Department Connections.
r. FM 1610 Plastic Pipe & Fittings for Underground Fire Protection Service.
s. FM 1620 Pipe Joints & Anchor Fittings for Underground Fire Service Mains.

9. Plastics Pipe Institute (PPI).
a. Underground Installation of Polyethylene Pipe.
b. Polyethylene Joining Procedures.
c. Inspections, Test and Safety Considerations.

10. American Association of State Highway and Transportation Officials (AASHTO) for H20 Loading.

11. American Concrete Institute (ACI).
a. ACI 348 - Meter Pit Construction.

12. Local Water District Standard Specifications and Details.
13. Local Office of the Fire Marshal Regulations.

14. Other authorities having jurisdiction.

B. System Description: Grades and elevations are to be established with benchmarks referenced on Plans.

C. Comply with authorities having jurisdiction for the installation and testing of potable water piping and fire protection systems.

D. All testing of systems specified in this section shall be witnessed by representatives of the local water department or local authority. Provide at least 7 days notice.

E. The Contractor shall prepare shop plans and calculations, and obtain all required approvals for the fire water system of the proposed project. Contractor shall have shop plans and calculations stamped and signed by a Fire Protection Engineer, licensed by the State of California, as required by the local jurisdiction.

PART 2 - PRODUCTS

2.1 PIPING
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A. Water Distribution Main (pipe size 4 inches and larger).

1. Ductile Iron Pipe (DIP): Pressure Class 350 pipe conforming to AWWA/ANSI C151/A21.5, cement-mortar lining conforming to AWWA/ANSI C104/A21.4, with standard thickness per AWWA/ANSI C150/A21.50. U.S. Pipe, American Cast Iron Pipe Company (ACIPCO), or approved equivalent.
a. Flanged ends shall conform to AWWA/ANSI C115/A21.15.
b. Rubber-gasket joints shall conform to AWWA/ANSI C111/A21.11.
2. Polyvinyl Chloride Pipe (PVC): Pressure Class 200, DR 14, spigot and gasket bell end, conforming to AWWA C900 or AWWA C905, with equivalent cast-iron pipe outer diameter (O.D.). J-M Manufacturing, PW Pipe, North American Pipe Company, or approved equivalent.

B. Water Service Line (pipe size 3 inches and smaller)

1. Copper (Cu): Provide Type K soft or hard copper pipe conforming to ASTM B88.
2. For pipe size 1 inches and smaller High Density Polyethylene Pipe (HDPE): PE3408, Pressure Class 200, DR 9 conforming to AWWA C901. PWPIPE or approved equivalent.

2.2 FITTINGS, GASKETS, COUPLINGS, SLEEVES, AND ASSEMBLY BOLTS AND NUTS

A. For DIP: Provide fittings with pressure rating greater than or equal to that of the pipe. Provide flanged joints, mechanical joints, push-on joints, and insulating joints where indicated. Fittings with push-on joint ends shall conform to the same requirements as fittings with mechanical-joint ends. Provide mechanically coupled type joints using a sleeve-type mechanical coupling where indicated. Provide ends of pipe and fittings suitable for the specified joints. Fittings shall have cement-mortar lining conforming to AWWA/ANSI C104/A21.4.

1. Flanged Joints: Provide bolts, nuts, and gaskets in conformance with AWWA/ANSI C115/A21.15. Flanged fittings shall conform to AWWA/ANSI C110/A21.10 or C153/A21.53.
   a. Provide flange for setscrewed flanges of ductile iron, ASTM A536, Grade 65-45-12, and conform to the applicable requirements of ASME B16.1, Class 250.
   b. Provide setscrews for setscrewed flanges of 190,000 psi tensile strength, heat treated and zinc-coated steel.
   c. Gaskets for setscrewed flanges shall conform to the applicable requirements for mechanical-joint gaskets specified in AWWA/ANSI C111/A21.11.
   d. Design of setscrewed gaskets shall provide for confinement and compression of gasket when joint to adjoining flange is made.
   e. Unless otherwise required, above ground flange assembly bolts shall be standard hex-head, cadmium plated machine bolts with American Standard Heavy, hot-pressed, cadmium plated hexagonal nuts. Buried flange nuts and bolts shall be as above except they shall be of Type 304 stainless steel.
2. Mechanical Joints: Dimensional and material requirements for pipe ends, glands, bolts and nuts, and gaskets shall conform to AWWA/ANSI C111/A21.11.
3. Push-on Joints: Provide shape of pipe ends and fitting ends, gaskets, and lubricant for joint assembly conforming to AWWA/ANSI C111/A21.11. Modify bell design fittings, as approved.
4. Insulating Joints: Provide a rubber-gasketed or other suitable approved type of insulating joint or dielectric coupling which will effectively prevent metal-to-metal contact at the joint between adjacent sections of dissimilar metals.
   a. Provide joint of the flanged type with insulating gasket, insulating bolt sleeves, and insulating washers.
   b. Provide gasket of the dielectric type, full face, as recommended in AWWA/ANSI C115/A21.15.
   c. Provide bolts and nuts as recommended in AWWA/ANSI C115/A21.15.

B. For PVC: Fittings shall be DIP.

1. DIP fittings: Provide gray-iron or ductile-iron conforming to AWWA/ANSI C110/A21.10, with cement-mortar lining conforming to AWWA/ANSI C104/A21.4, and standard thickness, with equivalent cast-iron pipe O.D.
   a. Fittings with push-on joint ends shall conform to the same requirements as fittings with mechanical-joint ends, except the bell design shall be modified, as approved, for push-on joint suitable for use with PVC plastic pipe.
   b. Provide push-on joints, compression joints and mechanical joints where indicated between pipe and fittings, valves, and other accessories.
   c. Mechanical joints, glands, bolts and nuts, and gaskets shall conform to AWWA/ANSI C111/A21.11.
   d. All fittings shall be epoxy-coated, 10-mil thickness conforming to AWWA C550.

C. For Cu:

1. Cast copper alloy solder-joint pressure fittings shall conform to ASME B16.18.
2. Wrought copper solder-joint pressure fittings or wrought copper alloy unions shall conform to ASME B16.22
3. Cast copper alloy flare fittings shall conform to ASME B16.26.
4. Wrought copper alloy body, hexagonal stock, metal-to-metal seating surfaces, and solder-joint threaded ends shall conform to ASME B1.20.1.
5. Compression connections shall be Mueller 110, Ford or approved equivalent.

D. For PE:

1. Cast Copper Fittings shall conform to ASME B16.18.
2. Cast Copper Compression Fittings and connections shall be Mueller 110 Ford or approved equivalent.

2.3 GATE VALVES AND BALL VALVES

A. Gate Valves: Valves shall open by counterclockwise rotation of the valve stem. Provide valves with ends as appropriate for the adjoining pipe.

1. Stuffing boxes shall have O-ring stem seals. Provide stuffing boxes bolted and constructed so as to permit easy removal of parts for repair.
2. Valves (2-1/2 inches and larger):
    a. Provide valves conforming to AWWA C500 or AWWA C509 and of one manufacturer. Valves shall have a non-rising stem, a 2-inch square nut, and double-disc gates. Valves shall be rated for 250 psi maximum working pressure. Mueller 2360 series, ACIPCO, or approved equivalent.
    b. For the domestic water system, valves shall also conform to ANSI/NSF 61.
    c. For the fire water system, valves 2 inches through 16 inches in size shall also conform to UL 262 and FM 1120 or FM 1130 to a working pressure of 200 psi.
3. Where a post indicator is shown, provide valve with an indicator post flange.

B. Ball Valves: Valves shall open by counterclockwise rotation of the valve stem. Provide valves with ends as appropriate for the adjoining pipe.

1. Valves (2-inches and smaller):
    a. Provide valves conforming to AWWA C800 and of one manufacturer. Mueller 300 Series, Ford, or approved equivalent.
2. Provide valve with lockable operating nut or handle as shown on the Construction Documents.

2.4 BLOW-OFF VALVES, AIR RELEASE AND VACUUM VALVES, AND COMBINATION AIR VALVES

A. Blow-off valves: Provide valve and service size as shown in the Construction Documents. Provide 2-inch valves at low points of the piping system, and 4-inch valves at dead-ends of the piping system, unless otherwise directed by the Program Manager.

1. 2-inch blow-off shall have a 2-inch vertical female iron pipe (FIP) inlet and a 2-inch normal pressure and temperature (NPT) nozzle outlet with cap. Valve shall open by counterclockwise rotation of a top-mounted 9/16-inch square operating nut. All working parts shall be serviceable without excavation. Kupferle/Truflo Model TF550, or approved equivalent.
2. 4-inch blow-off shall have a 4-inch vertical FIP inlet and a 4-inch male iron pipe (MIP) outlet with cap. Valve shall open by counterclockwise rotation of a top-mounted 9/16-inch square operating nut. All working parts shall be serviceable without excavation. Kupferle/Truflo Model TF800, or approved equivalent.

B. Air release and vacuum valves: Provide valve and service size as shown on the Construction Documents, and where there is an increase in the downward slope or a decrease in the upward slope of the piping system. Valve shall have cast-iron single valve body, and shall conform to AWWA C512. A compound lever system shall have a maximum operating pressure of 300psi. Provide a protective cap for the outlet of the valve. Provide universal air-vacuum type valves, Crispin Model UL, Apco, or approved equivalent.

C. Combination air valves: Provide valve and service size as shown on the Construction Documents, and at high points and sharp changes in gradient of the pipe system. Valve shall have cast-iron single valve or double valve body, and shall conform to AWWA C512. A simple or compound lever system shall have a maximum operating pressure of 300psi. Provide a protective cap for the outlet of the valve. Crispin Model C, Apco, or approved equivalent.

2.5 CHECK VALVES

A. Check Valves: Valves shall have clear port opening and a cast-iron body. Provide spring-loaded or weight-loaded valves where indicated on the Construction Documents.

1. For the domestic water system, provide swing-check type valves conforming to AWWA C508. Provide valves of one manufacturer. Mueller, Apco, or approved equivalent.
2. For the fire water system, provide swing-check type valves conforming to FM 1210 and UL 312. Mueller, Watts, or approved equivalent.

2.6 PRESSURE REDUCING VALVES

A. Pressure Reducing Valves: Valves shall have a cast-iron body, conforming to ASTM A536, with epoxy interior coating conforming to AWWA, and rated to pressure class 300. Cla-Val Model 90-01, Singer, or approved equivalent.

1. Valves shall have flanged ends.
2. Valves sized 3-inches or smaller may have screwed ends.

2.7 POST INDICATORS

A. Posts Indicators shall withstand up to 900 ft-lbs of operating torque, be free-standing, and tamper-proof.

B. Post Indicators shall conform to UL 789 and FM 1110. Mueller, ACIPCO, or approved equivalent.

2.8 VALVE BOXES, METER BOXES, FRAMES AND COVERS

A. Water Valve Box: Provide pre-cast concrete valve box for each buried valve. Provide box with steel or cast iron traffic cover marked “WATER”. Christy Model G5 with G5C cover or approved equivalent.

B. Valve or Meter Boxes: Contractor shall verify box size required for water system appurtenances as shown in the Construction Documents. Provide a precast concrete utility box for each buried appurtenance. Provide a traffic-rated lid for H20 loading. A non-traffic rated lid may be used for boxes located in landscape areas. Christy, or approved equivalent.

2.9 BACKFLOW PREVENTERS

A. Provide backflow preventers as shown on the Construction Documents. Subject to District’s approval. Backflow preventers on the fire water system shall be subject to approval by the local office of the fire marshal.

B. Reduced Pressure Principle Assemblies (RPPA): Provide a cast-iron body RPPA consisting of two independently operating check valves with a pressure differential relief valve located between the two check valves, two shut-off valves and four test cocks. RPPA shall be tamper-proof and conform to AWWA C511. Febco 860, Watts, or approved equivalent.

C. Double Check Detector Assemblies (DCDA): Provide a cast-iron body DCDA consisting of mainline double check assemblies in parallel with a bypass double check and meter assembly, two shut-off valves and four test cocks. DCDA shall be tamper-proof and conform to AWWA C510. Febco 806, Watts, or approved equivalent.

2.10 FIRE DEPARTMENT CONNECTIONS AND WET STAND PIPES

A. Fire Department Connections (FDC): Provide FDC’s with 2-1/2 inch female hose connections, sidewalk or free-standing type. Number of inlets shall be as shown on the Construction Documents. Clapper and spring check inlets shall each have a minimum capacity of 250 gpm, and be furnished with a cap and chain. Outlet shall be sized for simultaneous use of all inlets. Connection shall be branded “Building XX”.

1. 2-Way FDC: Connection shall conform to UL 405 or FM 1530. Elkhart, Croker, or approved equivalent.
2. 3-Way FDC: Connection shall be subject to approval by the local water department or fire marshal. Elkhart, Croker, Potter-Roemer or approved equivalent.
3. 4-Way FDC: Connection shall conform to UL 405. Potter-Roemer, Croker, or approved equivalent.
4. 6-Way FDC: Connection shall be subject to approval by the local water department or fire marshal. Croker, Potter-Roemer or approved equivalent.

2.11 FIRE HYDRANTS

A. Provide two 2-1/2 inch and one 4-1/2 inch outlets, with a 6-inch nominal inside diameter inlet and break-away type bolts. Hydrant shall have a working pressure of 250 psi and shall conform to AWWA C502 or C503, and be UL listed and FM approved. Provide hydrants of one manufacturer. Clow model 960 series or approved equivalent, subject to approval of the District and fire marshal.

2.12 THRUST BLOCKS AND PIPE RESTRAINTS

A. Thrust Blocks: Provide thrust blocks in accordance with NFPA 24 Standards. Use concrete conforming to ASTM C94 having a minimum compressive strength of 2,500 psi at 28 days; or use concrete of a mix not leaner than one part cement, 2-1/2 parts sand, and 5 parts gravel, having the same minimum compressive strength.

B. Pipe Restraints: Provide thrust restraint systems for fittings and joints as indicated on the Plans. Restrained lengths for onsite fire system will be as indicated on the Plans.

1. For mechanical joint fittings and joints: Pipe restraints shall be “Mega-Lug” pipe restraint system by EBBA Iron, Inc., or approved equivalent.

2. For push-on joint fittings and joints: Pipe restraints shall be “Field-Lok” gaskets by U.S. Pipe, or approved equivalent.

C. Thrust blocks or mechanical pipe restraints may be used at Contractor’s option, unless otherwise indicated on the Plans.

D. Provide thrust blocks or mechanical pipe restraints at all fittings and changes in angle, alignment or elevation.

E. Where depth or location of existing structures prohibit the use of standard thrust blocks, gravity blocks may be used. Conform to NFPA 24 Standards.

2.13 TAPPING SLEEVES AND TAPPING VALVES

A. Tapping sleeves shall be epoxy coated and furnished with stainless steel washers, nuts and bolts. Mueller H-615 and H-619, Ford, or approved equivalent.

B. Tapping valves shall have flanged inlet, Class 125, conforming to ASME B16.1 and furnished with stainless steel washers, nuts and bolts. Tapping valves shall be constructed with a mechanical joint outlet. Mueller T-687, T-642, T-681, or approved equivalent.

2.14 SERVICE SADDLES AND CORPORATION STOPS

A. Service Saddles: Saddles shall conform to AWWA C800 and NSF 61.

1. For DIP: Provide bronze or stainless steel body, double strap type with a 200 psi maximum working pressure. Mueller BR2 Series, Ford, or approved equivalent.
2. For PVC: Provide bronze body, wide strap type. Mueller H-13000 Series, Ford, or approved equivalent.
3. For PE: Per manufacturer's recommendations.

B. Corporation Stops: Provide ground key type; bronze conforming to ASTM B61 or ASTM B62, for a working pressure of 100 psi. and suitable for the working pressure of the system.

1. Ends shall be suitable for adjoining pipe and connections, solder-joint, or flared tube compression type joint.
2. Threaded ends shall conform to AWWA C800.
3 Coupling nut for connection to flared copper tubing shall conform to ASME B16.26.
4. Mueller H-15000 Series with "CC" threads and a copper flare straight connection outlet, Ford, or approved equivalent.

2.15 IDENTIFICATION MATERIALS AND DEVICES

A. Marker Tape: Provide marker tape consisting of metallic foil bonded to plastic film not less than 2-inches wide. Film shall be inert polyethylene plastic. Film and foil shall each not be less than 1-mil. thick. The tape shall be identified with lettering, not less than 3/4-inch high, "CAUTION: WATER MAIN BELOW", repeated at approximately 24-inch intervals.

B. Tracer Wire for Nonmetallic Piping: Provide 12 gage, coated copper or aluminum wire not less than 0.10 inch in diameter in sufficient length to be continuous over each separate run of nonmetallic pipe. Wire shall be tied in at all valves.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and areas for suitable conditions where water service is being installed.

B. Do not begin installation until unsatisfactory conditions have been corrected.

3.2 LOCATION OF WATER LINES

A. Where the location of the water line is not clearly defined by dimensions on the Plans, do not lay water line closer than 10 feet horizontally from any sewer line.

B. Where water lines cross under gravity sewer lines, encase sewer line in concrete for a distance of at least 10 feet on each side of the crossing, unless sewer line is made of pressure pipe with rubber-gasketed joints and no joint is located within 3 feet horizontally of the crossing.

C. Where water lines cross sewer force mains and inverted siphons, install water line at least 2 feet above these sewer lines.

D When joints in the sewer line are closer than 3 feet horizontally from the water line, encase sewer line joints in concrete.

E. Do not lay water lines in the same trench with other utilities.

F. Install water lines at 3'-0" minimum depth or as detailed on Plans.

3.3 INSTALLATION OF PIPING

A Inspection:

1. Before placing in position, inspect pipe for noticeable defects. Clean the inside and outside of the pipe, fittings, valves, and accessories, and maintain in a clean condition.
2. Remove fins and burrs from pipe and fittings.

B. Pipe laying and jointing:

1. Provide proper facilities for lowering sections of pipe into trenches.
2. Do not drop or dump pipe, fittings, valves, or any other water line material into trenches.
3. Cut pipe accurately to length established at the site and work into place without springing or forcing. Replace any pipe or fitting that does not allow sufficient space for proper installation of jointing material.
4. Blocking or wedging between bells and spigots will not be permitted. Lay bell-and-spigot pipe with the bell end pointing in the direction of laying.
5. Grade the pipeline in straight lines; avoid the formation of dips and low points.
6. Support pipe at proper elevation and grade.

7. Provide secure firm, uniform support. Wood support blocking will not be permitted.
8. Lay pipe so that the full length of each section of pipe and each fitting rests solidly on the pipe bedding; excavate recesses to accommodate bells, joints, and couplings.
9. Provide anchors and supports where indicated and where necessary for fastening work into place.
10. Make proper provision for expansion and contraction of pipelines.
11. Keep trenches free of water until joints have been properly made.
12. Do not lay pipe when conditions of trench or weather prevent proper installation.
13. All fittings shall be blocked with appropriately sized thrust blocks as shown in the Construction Documents.

C. Installation of Tracer Wire:

1. Install a continuous length of tracer wire for the full length of each run of nonmetallic pipe.
2. Attach wire to top of pipe in such manner that it will not be displaced during construction operations.

D. Connections to Existing Lines:

1. Make connections to existing water lines after approval is obtained and with a minimum interruption of service on the existing line.
2. Make connections to existing lines under pressure in accordance with the recommended procedures of a manufacturer of pipe of which the line being tapped is made.

E. At the end of each work day, close open ends of pipe temporarily with wood blocks or bulkheads to keep out debris and contamination.

3.4. INSTALLATION OF DUCTILE-IRON PIPING

A. Install pipe and fittings in accordance with requirements of AWWA C600 for pipe installation, joint assembly, valve-and-fitting installation, and thrust restraint.

B. Jointing:

1. Provide push-on joints with the gaskets and lubricant specified for this type joint; assemble in accordance with the applicable requirements of AWWA C600 for joint assembly.
2. Provide mechanical joints with the gaskets, glands, bolts, and nuts specified for this type joint; assemble in accordance with the applicable requirements of AWWA C600 for joint assembly and with the recommendations of AWWA C111.
3. Provide flanged joints with the gaskets, bolts, and nuts specified for this type joint.
   a. Install flanged joints up tight; avoid undue strain on flanges, fittings, valves, and other equipment and accessories.
   b. Align bolt holes for each flanged joint.
   c. Use full size bolts for the bolt holes; use of undersized bolts to make up for misalignment of bolt holes or for any other purpose will not be permitted.
   d. Do not allow adjoining flange faces to be out of parallel to such degree that the flanged joint cannot be made watertight without over straining the flange.
   e. Where flanged pipe and fitting have dimensions that do not allow the installation of a proper flanged joint as specified, replace it by one of proper dimensions.
   f. Use setscrewed flanges to make flanged joints where conditions prevent the use of full-length flanged pipe. Assemble in accordance with the recommendations of the setscrewed flange manufacturer.
4. Provide insulating joints with the gaskets, sleeves, washers, bolts, and nuts previously specified for this type joint. Assemble insulating joints as specified for flanged joints. Bolts for insulating sleeves shall be full size for the bolt holes.
5. Ensure that there is no metal-to-metal contact between dissimilar metals after the joint has been assembled.

C. Exterior Protection: Completely encase buried ductile iron pipelines and underground appurtenances with polyethylene wrap. Install 8-mil linear low-density polyethylene (LLD) film or 4-mil high-density cross-laminated (HDCL) film per manufacturer's recommendations and in accordance with AWWA/ANSI C105/A21.5 and ASTM A674.

D. Pipe Anchorage:

1. Provide concrete thrust blocks or restrained joints for pipe anchorage, except where metal harness is indicated on the Construction Documents.
2. Pipe anchorage shall be in accordance with NFPA 24 Standards.

3.5 INSTALLATION OF POLYVINYL CHLORIDE PIPING

A. Install pipe and fittings in accordance with the requirements of UNI B-3 for the following:

1. The laying of pipe, joining PVC pipe to fittings and accessories.
2. The setting of hydrants, valves, and fittings.

B. Comply with the recommendations for pipe joint assembly and appurtenance installation in AWWA Manual M23, Chapter 7, "Installation".

C. Comply with the applicable requirements of AWWA C600 for joint assembly, and with the recommendations of Appendix A to AWWA C111.

D. Jointing:

1. Provide push-on joints with the elastomeric gaskets specified for this type joint, using either elastomeric-gasket bell-end pipe or elastomeric-gasket couplings.
2. For pipe-to-pipe push-on joint connections, use only pipe with push-on joint ends having factory-made bevel.
3. For push-on joint connections to metal fittings, valves, and other accessories, cut spigot end of pipe off square and re-bevel pipe end to a bevel approximately the same as that on ductile-iron pipe used for the same type of joint.
4. Use an approved lubricant recommended by the pipe manufacturer for push-on joints.
5. Assemble push-on joints for connection to fittings, valves, and other accessories in accordance with the requirements of UNI B-3 for joining PVC pipe to fittings and accessories and with the applicable requirements of AWWA C600 for joint assembly.
6. Make compression-type joints/mechanical-joints with the gaskets, glands, bolts, nuts, and internal stiffeners previously specified for this type joint. Cut off spigot end of pipe for compression-type joint or mechanical-joint connections and do not re-bevel.
7. Assemble joints made with sleeve-type mechanical couplings in accordance with the recommendations of the coupling manufacturer using internal stiffeners as previously specified for compression-type joints.

E. Pipe Anchorage:

1. Provide concrete thrust blocks or restrained joints for pipe anchorage, except where metal harness is indicated on the Construction Documents.
2. Anchorage shall be in accordance with the requirements of UNI B-3 and in accordance with NFPA 24 Standards for reaction or thrust blocking and plugging of dead ends, except that size and positioning of thrust blocks shall be as indicated on the Construction Documents.

3.6 INSTALLATION OF POLYETHYLENE PIPING

A. Install pipe, fittings, and appurtenances in accordance with PPI and Manufacturer's Recommendations.

B. Jointing:

1. Provide mechanical joints, compression fittings, or flanges as recommended by the manufacturer.
2. Jointing shall be performed using proper equipment and machinery by trained and certified personnel.
3. Joints, fittings and tools shall be clean and free of burrs, oil, and dirt.
4. Butt fusion:
   a. Pipe ends shall be faced to establish clean, parallel mating surfaces.
   b. Align and securely fasten the components to be joined squarely between the jaws of the joining machine.
   c. Heat the ends of the pipe to the pipe manufacturer's recommended temperature interface pressure and time duration. A pyrometer or other surface temperature measuring device should be used to insure proper temperature of the heating tool. Temperature indicating crayons shall not be used on a surface which will come into contact with the pipe or fitting.
   d. Prevent molten plastic from sticking to the heater faces. Molten plastic on the heater faces shall be removed immediately according to the tool manufacturer's instructions.
   e. Bring the molten ends together with sufficient pressure to properly mix the pipe materials and form a homogeneous joint. Hold the molten joint under pressure until cooled adequately to develop strength. Refer to the Manufacturer's recommendations for temperature, pressure, holding, and cooling times.
   f. Remove the inside bead from the fusion process using Manufacturer's recommended procedure.
5. Socket fusion:
   a. Mixing manufacturers' heating tools and depth gages will not be allowed unless the tools conform to ASTM F1056.
   b. Pipe ends shall be faced square to establish clean, parallel mating surfaces.

c. Clamp the cold ring on the pipe at the proper position using a depth gauge.
d. Heat the tool to the pipe manufacturer's recommended temperature. A pyrometer or other surface temperature measuring device should be used to insure proper temperature. Temperature indicating crayons shall not be used on a surface which will come into contact with the pipe or fitting.
e. Follow manufacturer's recommendations for bringing the hot tool faces into contact with the outside surface of the end of the pipe and the inside surface of the socket fitting.
f. Simultaneously remove the pipe and fitting from the tool.
g. Inspect the melt pattern for uniformity and immediately insert the pipe squarely and fully into the socket of the fitting until the fitting contacts the cold ring. Do not twist the pipe or fitting during or after the insertion.
h. Hold or block the pipe in place during cooling.

6. Electrofusion:
a. Unless the operation is for a saddle-type electrofusion joint, pipe ends shall be faced square to establish clean, parallel mating surfaces.
b. Clamp the pipe and fitting at the proper position in the fixture.
c. Connect the electrofusion control box to the fitting and to the power source. Apply the electric current using manufacturer's instructions.
d. Allow the joint to cool before removing the clamping fixtures.

3.7 INSTALLATION OF VALVES

A. Install gate valves conforming to AWWA C500 and UL 262 in accordance with the requirements of AWWA C600 for valve-and-fitting installation and with the recommendations of the Appendix (Installation, operation, and Maintenance of Gate Valves) to AWWA C509.

B. Install gate valves conforming to AWWA C509 in accordance with the requirements of AWWA C600 for valve-and-fitting installation and with the recommendations of the Appendix (Installation, Operation, and Maintenance of Gate Valves) to AWWA C509.

C. Install gate valves on PVC water mains in addition in accordance with the recommendations for appurtenance installation in AWWA Manual M23, Chapter 7, "Installation."

D. Install check valves in accordance with the applicable requirements of AWWA C600 for valve-and-fitting installation, except as otherwise indicated.

E. Provide and assemble joints to gate valves and check valves as specified for making and assembling the same type joints between pipe and fittings.

3.8 INSTALLATION OF VALVE AND METER BOXES

A. Boxes shall be centered over the appurtenance so as not to transmit shock or stress. Covers shall be set flush with the surface of the finished pavement, or as shown in the Construction Documents. Backfill shall be placed around the boxes and compacted to the specified level in a manner that will not damage or displace the box from proper alignment or grade. Misaligned boxed shall be excavated, plumbed, and backfilled at no additional cost to the District.

3.9 INSTALLATION OF HYDRANTS

A. Install hydrants, except for metal harness, plumbed vertical, in accordance with AWWA C600 for hydrant installation and as indicated.

B. Provide and assemble joints as specified for making and assembling the same type joints between pipe and fittings. Hydrants shall be set so that mounting bolts clear the top of finished grade by three inches so bolts may be easily replace if needed.

C. Provide metal harness as specified under pipe anchorage requirements for the respective pipeline material to which hydrant is attached.

3.10 SERVICE LINE CONNECTIONS TO WATER MAINS

A. Connect service lines of size shown on plans to the main with a rigid connection or a corporation stop and gooseneck. Install a gate valve on the service line.

B. Connect service lines to ductile-iron water mains in accordance with AWWA C600 for service taps.

C. Connect service lines to PVC plastic water mains in accordance with UNI-B-8 and the recommendations of AWWA Manual M231, Chapter 9, "Service Connections."

3.11 INSTALLATION OF BACKFLOW PREVENTERS

A. Backflow devices shall be installed horizontal and level, with three feet minimum clearances from obstructions.

3.12 HYDROSTATIC PIPELINE TESTING

A. Requirements:

1. After the pipe has been laid and backfilled, perform hydrostatic pressure tests.
2. Do not conduct tests until at least 12 hours have elapsed since pipe laying and at least 5 days have elapsed since placing of concrete thrust blocks.
3. Fill the pipe with water which shall remain without external application of pressure for 24 hours before tests are conducted.
4. Prior to hydrostatic testing, flush pipe system with fresh water until piping is free of dirt and foreign matter.
5. Apply pressure by a pump and measured by a test gage. All necessary apparatus and labor for conducting the pressure and leakage tests shall be furnished by the Contractor.
6. Ensure the release of air from the line during filling, and prevent collapse due to vacuum when dewatering the line.
7. For pressure test, use a hydrostatic pressure not less than 200 psi. The duration of the test shall not be less than 4 hours with the variation in pressure of not more than 5 psi for the duration of the test.

B. Leakage Tests:

1. Perform tests at the same time as pressure tests.
2. Leakage rate shall be measured for at least 4 hours with a certified water meter, or other approved method. If requested, meter certification shall be submitted to the District for approval prior to testing.
3. Leakage shall not be measured by a drop in pressure in a test section over a period of time.
4. Leakage at mechanical couplings and joints, tapping sleeves, saddles, flanged joints, and copper piping will not be accepted. Correct any visible leaks.
5. Push-on joints: Test ductile iron pipe for leakage in accordance with AWWA C600 as shown in the following table:

TABLE 1

Allowable Leakage per 1000 feet of DIP Pipeline (Gal/Hr)

Average Test Pressure	Nominal Pipe Diameter - Inches									
(psi)	3	4	6	8	10	12	14	16	18	20
300	0.39	0.52	0.78	1.04	1.30	1.56	1.82	2.08	2.34	2.60
275	0.37	0.50	0.75	1.00	.124	1.49	1.74	1.99	2.24	2.49
250	0.36	0.47	0.71	0.95	1.19	1.42	1.66	1.90	2.14	2.37
225	0.34	0.45	0.68	0.90	1.13	1.35	1.58	1.80	2.03	2.25
200	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70	1.91	2.12

6. When the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.
7. Test polyvinyl chloride pipe for leakage in accordance with the recommendations of the Uni-Bell Plastic Pipe Association (UNI) as shown in the following table:

TABLE 2

Allowable Leakage per 1000 feet or 50 joints of PVC Pipeline (Gal/Hr)

Nominal Pipe Size (inches)	Average Test Pressure in Line (psi.)	
	200	250
4	0.38	0.43
6	0.57	0.64
8	0.76	0.85
10	0.96	1.07
12	1.15	1.28
14	1.34	1.50
16	1.53	1.71
18	1.72	1.92
20	1.91	2.14

8. Should any section of new pipe fail to pass either test, locate and repair the defective pipe and repeat the test.

3.13 STERILIZATION AND FLUSHING

A. General:

1. Disinfect domestic water lines, mains, and branches by chlorination in accordance with AWWA C601 and as herein specified.

B. Sterilization Methods:

1. Liquid Chlorine Solution Method:
   a. Flush all foreign matter from mains, branch runs, hydrant runs, and installed services.
   b. Introduce liquid chlorine solution at appropriate locations to assure uniform distribution through the facilities at the proper concentration.
   c. Do not use installed copper service lines to convey the concentrated chlorine solution to the mains.
   d. The sanitizing solution shall be retained in the facilities for a period of 24 hours after which each service, hydrant run, branch run and dead end shall be flushed until:
      i. Residual chlorine is less than 1 part per million.
      ii. Residual chlorine is no greater than the concentration of chlorine in the water supplied for flushing.
   e. Chlorine shall be a 1 percent solution (containing 10,000 parts per million available chlorine) or shall be obtained by use of dry chlorine in tablet form firmly attached to inside tope of the pipe.
   f. The required concentration of chlorine in the pipe is 50 parts per million. This concentration may be attained by adding 5 gallons of the chlorine solution to 1,000 gallons of water.
   g. The weight of chlorine or chlorine compound required to make a 1 percent chlorine solution is as follows:

TABLE 3

One-Percent Chlorine Solution Mix

AMOUNT OF PRODUCT COMPOUND		QUANTITY OF WATER (in gallons)
High-Test Calcium Hypochlorite (65-70% Cl)	1 pound	7.50
Chlorinated Lime (32-35% Cl)	2 pounds	7.50
Liquid Laundry Bleach (5.25% Cl)	1 gallon	4.25
Liquid Chlorine (100% available chlorine)	0.62 pounds	7.50

2. HTH Tablet Method:

   a. The required concentration of chlorine in the mains may be obtained by the use of HTH tablets as produced by Olin Mathieson in the following quantities or approved equivalent:

TABLE 4

HTH Tablet (70%) Dosage
Number of Tablets Per Length of Pipe

Length of Section	DIAMETER OF PIPE				
	4 inches	6 inches	8 inches	10 inches	12 inches
13 feet or less	1	2	3	4	6
18 feet	1	2	3	5	6
20 feet	1	2	3	5	7
30 feet	2	3	5	7	10
36 feet	2	3	5	8	12
40 feet	2	4	6	9	14
100 feet	4	9	15	23	30

   b. Tablets are to be fastened to the inside top surface of each length of pipe using “Permatex No. 1" no earlier than the day pipe is laid.
   c. Tablets shall not be installed in the pipe and left overnight before laying and shall not be accessible at any time for casual pilferage by the general public or by children. Tablets shall be stored in a hermetically sealed container.
   d. The new water lines are to be slowly filled with water. Air is to be exhausted from each dead end, branch run, hydrant run, and installed service.
   e. Water shall be retained for a period of 24 hours, after which each service, hydrant run, branch run and dead end shall be thoroughly flushed to clear foreign matter and until:
      i. Residual chlorine concentration is less than 1 part per million
      ii. Residual chlorine is no greater than the concentration of chlorine in the water supplied for flushing.

B. Bacteriological Testing:

   1. Samples shall be gathered and tests conducted at the expense of the Contractor by a laboratory approved by the District.
   2. Samples are to be taken at representative points not less than one test per every 500 feet of pipe, plus one test at each end of the pipe; or as required by the District and inspector having jurisdiction.
   3. The new water lines shall remain isolated and out of service until satisfactory test results have been obtained that:
      a. All samples shall be tested and show the absence of Coliform Organisms, the presence of free chlorine residual (and shall equal to that of source water). Turbidity, PH and

Heterotrophic Plate Count shall also match that of the source water.

b. District has accepted the results as indicative of the bacteriological condition of the facilities.

c. If unsatisfactory or doubtful results are obtained from the initial sampling, repeat the chlorination process until acceptable test results are reported.

d. Source water shall be that of the campus.

END OF SECTION

Section 33 30 00
SANITARY SEWER

PART 1 – GENERAL

1.1 SUMMARY

A. This section describes general requirements, products, and methods of execution relating to on-site sanitary sewerage excluding portions within five feet of buildings unless otherwise noted. Any work within the public right-of-way shall be constructed to the standards of the local sanitation district, which would include one of the following: City of Fairfield; City of Vacaville; Vallejo Sanitation and Flood Control Department; and the State of California Department of Transportation.

1. Sanitary Sewer System, including piping and structures.

B. Contractor shall provide all labor, equipment, and materials, unless otherwise noted.

C. Related Sections:

1. Section 31 23 33 – TRENCHING, BACKFILLING, AND COMPACTING.

1.2 SUBMITTALS

A. Comply with the requirements of Section SUBMITTAL PROCEDURES.

B. Product Data: Manufacturer's literature and data, including, where applicable, pressure rating, capacity, labels, or other markings on equipment made to the specified standards for materials, for the following:

1. Piping and fittings.
2. Jointing material.
3. Gaskets, couplings, and sleeves.
4. Precast concrete structures, including manholes.
5. Concrete mix design for sanitary structures.
6. Manhole lids and frames.
7. Steps.
8. Pipe to Structure Connection Seal
9. Clean-out boxes.
10. Lift Station Vault.
11. Pump Data.

1.3 QUALITY ASSURANCE

A. Comply with the latest editions of the following Standards and Regulations:

1. American Concrete Pipe Association (ACPA).
   a. ACPA 01-102 (1988) Concrete Pipe Handbook.
   b. ACPA 01-103 (1995) Concrete Pipe Installation Manual.
2. American National Standards Institute (ANSI).

a. ANSI B18.5.2.1M (1981; R 1995) Metric Round Head Short Square Neck Bolts.

3. American Railway Engineering & Maintenance-of-Way Association (AREMA).
   a. AREMA 1-5 (2001) Pipelines.
4. American Society for Testing and Materials (ASTM).
   a. A 123/A 123M (2001a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

b. A 307 (2000) Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
c. A 47 (1999) Ferritic Malleable Iron Castings.
d. A 47M (1990; R 1996) Ferritic Malleable Iron Castings (Metric).
e. A 48 (1994ae1) Gray Iron Castings.
f. A 48M (1994e1) Gray Iron Castings (Metric).
g. A 536 (1984; R 1999e1) Ductile Iron Castings.
h. A 563 (2000) Carbon and Alloy Steel Nuts.
i. A 563M (2001) Carbon and Alloy Steel Nuts (Metric).
j. A 74 (1998) Cast Iron Soil Pipe and Fittings.
k. A 746 (1999) Ductile Iron Gravity Sewer Pipe.
l. C 12 (2002) Installing Vitrified Clay Pipe Lines.
m. C 14 (1999) Concrete Sewer, Storm Drain, and Culvert Pipe.
n. C 14M (1999) Concrete Sewer, Storm Drain, and Culvert Pipe (Metric).
o. C 150 (2002) Portland Cement.
p. C 260 (2001) Air-Entraining Admixtures for Concrete.
p. C 270 (2001a) Mortar for Unit Masonry.
q. C 301 (1998) Vitrified Clay Pipe.
r. C 33 (2001a) Concrete Aggregates.
s. C 361 (1999) Reinforced Concrete Low-Head Pressure Pipe.
t. C 361M (1999) Reinforced Concrete Low-Head Pressure (Metric).
u. C 425 (2002) Compression Joints for Vitrified Clay Pipe and Fittings.
v. C 443 (2001) Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
w. C 443M (2001) Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets (Metric).
x. C 478 (1997) Precast Reinforced Concrete Manhole Sections.
y. C 478M (1997) Precast Reinforced Concrete Manhole Sections (Metric).
z. C 494 Chemical Admixtures for Concrete.
aa. C 564 (1997) Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
ab. C 700 (2002) Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.
ac. C 76 (2000) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
ad. C 76M (2000) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe (Metric).
ae. C 828 (2001) Low-Pressure Air Test of Vitrified Clay Pipe Lines.
af. C 920 (2002) Elastomeric Joint Sealants.
ag. C 923 (2000) Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.
ah. C 923M (1998) Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals (Metric).
ai. C 924 (1989; R 1997) Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method.
aj. C 924M (1989; R 1998) Testing Concrete Pipe Sewer Liner by Low-Pressure Air Test Method (Metric).
ak. C 94 (1994) Ready-Mixed Concrete.
al. C 94/C 94M (2000e2) Ready-Mixed Concrete.
am. C 969 (2000) Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines.
an. C 969M (2000) Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines (Metric).
ao. C 972 (2000) Compression-Recovery of Tape Sealant.
ap. C 990 (2001a) Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealers.
aq. C 990M (2001a) Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants (Metric).
ar. D 1784 (1999a) Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
as. D 1785 (1999) Poly(Vinyl Chloride)(PVC) Plastic Pipe, Schedules 40, 80, and 120.
at. D 2235 (2001) Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
au. D 2241 (2000) Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
av. D 2321 (2000) Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
aw. D 2412 (1996a) Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
ax. D 2464 (1999) Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
ay. D 2466 (2001) Poly(Vinyl Chloride)(PVC) Plastic Pipe Fittings, Schedule 40.
az. D 2467 (2001) Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
ba. D 2680 (2001) Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping.
bb. D 2751 (1996a) Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings.
bc. D 2996 (2001) Filament-Wound "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.
bd. D 2997 (2001) Centrifugally Cast "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.
be. D 3034 (2000) Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
bf. D 3139 (1998) Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
bg. D 3212 (1996a) Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
bh. D 3262 (2002) "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe.
bi. D 3350 (2002) Polyethylene Plastics Pipe and Fittings Materials.
bj. D 3753 (1999)Glass-Fiber-Reinforced Manholes.
bk. D 3840 (2001) "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Fittings for Non-pressure Applications.
bl. D 4101 (2002) Propylene Injection and Extrusion Materials.
bm. D 412 (1998a) Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers – Tension.
bn. D 4161 (2001) "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.
bo. D 624 (2000) Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
bp. F 1336 (2002) Poly(Vinyl Chloride) (PVC) Gasketed Sewer Fittings.
bq. F 402 (1993; R 1999) Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings.
br. F 405 (1997) Corrugated Polyethylene (PE) Tubing and Fittings.
bs. F 477 (1999) Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
bt. F 714 (2001) Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
bu. F 758 (1995; R 2000) Smooth-Wall Poly(Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage.

bv. F 794 (1999) Poly(Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
bw. F 894 (1998a) Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe.
bx. F 949 (2001a) Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings.

5. ASME International (ASME).
   a. B1.20.1 (1983; R 2001) Pipe Threads, General Purpose, Inch.
   b. B16.1 (1998) Cast Iron Pipe Flanges and Flanged Fittings.
   c. B18.2.2 (1987; R 1999) Square and Hex Nuts.
   d. B18.5.2.2M (1982; R 2000) Metric Round Head Square Neck Bolts.
6. American Water Works Association (AWWA).
   a. C104 (1995) Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
   b. C105 (1999) Polyethylene Encasement for Ductile-Iron Pipe Systems.
   c. C110 (1998) Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (76 mm through 1219 mm), for Water.
   d. C111 (2000) Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
   e. C115 (1999) Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges.
   f. C151 (1996) Ductile-Iron Pipe, Centrifugally Cast, for Water.
   g. C153 (2000) Ductile-Iron Compact Fittings for Water Service.
   h. C302 (1995) Reinforced Concrete Pressure Pipe, Noncylinder Type.
   i. C600 (1999) Installation of Ductile-Iron Water Mains and Their Appurtenances.
   j. C606 (1997) Grooved and Shouldered Joints.
   k. C900 (1997) Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Distribution.
   l. M23 (1980) Manual: PVC Pipe - Design and Installation.
   m. M9 (1995) Manual: Concrete Pressure Pipe.
7. California Department of Transportation (CDT): Standard Specifications:
   a. Section 55:
   b. Section 70:
   c. Section 75:
8. Cast Iron Soil Pipe Institute (CISPI).
   a. 301 (2000) Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
   b. 310 (1997) Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
9. Uni-Bell PVC Pipe Association (UBPPA).
   a. UNI-B-3 (1992) Recommended Practice for the Installation of Polyvinyl Chloride (PVC) Pressure Pipe (Nominal Diameters 4-36 Inch).
   b. UNI-B-6 (1990) Recommended Practice for the Low-Pressure Air Testing of Installed Sewer Pipe.

10 City of Fairfield Standard Plans and Specifications.
11. City of Vacaville Standard Plans and Specifications.
12. Vallejo Sanitation and Flood Control District Standard Plans and Specifications.
13. American Association of State Highway and Transportation Officials (AASHTO) for H20 Loading.
14. American Concrete Institute (ACI).
15. Other authorities having jurisdiction.

B. System Description: Grades and elevations are to be established with reference to the benchmarks referenced on the Plans.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Storage

1. Piping: Inspect materials delivered to site for damage; store with minimum of handling. Store materials on site in enclosures or under protective coverings. Store plastic piping and jointing materials and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.
2. Metal Items: Check upon arrival; identify and segregate as to types, functions, and sizes. Store off the ground in a manner affording easy accessibility and not causing excessive rusting or coating with grease or other objectionable materials.

B Handling

1. Handle pipe, fittings, and other accessories in such manner as to ensure delivery to the trench in sound undamaged condition. When handling lined pipe, take special care not to damage linings of pipe and fittings; if lining is damaged, make satisfactory repairs. Carry, do not drag, pipe to trench.

PART 2 – PRODUCTS

2.1 PIPING

A. Polyvinyl Chloride (PVC) Pipe: PVC pipe conforming to ASTM D3034, SDR 26 with bell-and-spigot type of rubber gasket joints. Bells shall be integral with pipe. Spigot end pipe with separate double hub couplings is not acceptable.

B. Vitrified Clay Pipe (VCP): VCP and fitting shall conform to ASTM C700, Extra Strength.

2.2 MANHOLES

A. Manholes shall be pre-cast concrete of the size and shape shown on the Plans and shall conform to Sections 70-1.02H of the CDT Standard Specifications and to ASTM C478. Equivalent poured-in-place structures may be used at the Contractor's option. Concrete shall consist of Caltrans Type I/II cement.

B. Frames and covers shall be cast iron conforming to Section 55-2.03 and 75-1.02 of the CDT Standard Specifications. Manhole covers shall have the words "SANITARY SEWER" in letters not less than 2 inches cast into the cover. The clear opening for all manhole covers shall be 24 inches.

C. All interior concrete surfaces shall be coated with "Xypex Crystalline" or approved equivalent. Use of a water-resistant admix is acceptable, at contractor option.

D. Frames and lids for manholes shall be match-marked in pairs before delivery to the job site. The lids shall fit into their frames without rocking.

E. Reinforcing Bars: Reinforcing bars shall be of intermediate grade billet steel conforming to ASTM A615 and shall be of the size shown on the Standard Details or in the Plans. Bars shall be of the round deformed type, free from injurious seams, flaws, or cracks, and shall be cleaned of all rust, dirt, grease and loose scales.

F. Portland Cement Concrete: Concrete for manhole bases, inlets, and other concrete structures shall conform to the requirements of CDT Section 90 and as herein specified. The concrete shall be Class "A" containing six (6) sacks of Portland Cement per cubic yard of concrete. The grading of the combined aggregate shall conform with the CDT requirements of the three-quarter inch maximum. The consistency of the fresh aggregate shall be such that the slump does not exceed four inches, as determined by Test Method No. Calif. 520. The concrete shall have a minimum design compressive strength of 3,000 psi after 28 days.

2.3 CLEAN-OUTS

A. Where cleanouts are located in landscaping, a box shall be provided for each clean-out. Boxes shall be pre-cast concrete with cast iron frame and cover marked "SAN SEWER"; Christy G5 with G5C lid or approved equivalent. Where cleanouts are in hardscape, minimize the aesthetic impact of the cleanout by eliminating the concrete box (cleanout cover flush with hardscape).

2.4 PIPE TO STRUCTURE CONNECTOR/SEAL

A. A flexible pipe to manhole connector shall be used for all pipe penetrations to pre-cast and/or cast-in-place concrete structures.

1. The seal shall provide a flexible, positive, watertight connection between pipe and concrete wastewater structures. The connector shall assure that a seal is made between (1) the connector and the structure wall, and (2) between the connector and the pipe. The seal between the connector and the manhole wall shall be made by casting the connector integrally with the structure wall during the manufacturing process in such a manner that it will not pull out during coupling. The seal between connector and pipe will be made by way of a stainless steel take down band compressing the gasket against the outside diameter of the pipe.

   The connector shall be molded from materials whose physical/chemical properties meet or exceed the physical/chemical resistant properties outlined in ASTM C-923. The connector and stainless steel hardware shall meet or exceed the performance requirements proscribed in ASTM C-923.

   The connector shall be of size specifically designed for the pipe material being used and shall be installed in accordance with recommendations of the manufacturer.

2. Connectors shall be Z-LOK or G3 connectors manufactured by A-LOK Products Inc. or approved equivalent.

PART 3 – EXECUTION

3.1 PIPE INSTALLATION

A. Pipe shall be installed in conformance with Section 31 23 33 – TRENCHING, BACKFILLING AND COMPACTING, and manufacturer's recommendations.

B. Pipe laying:

1. No pipe shall be laid until the Geotechnical Project Manager inspects and approves the conditions of the bottom of the trench.
2. Pipe laying shall proceed "up grade" with the spigot section of the bell-and-spigot pipe pointing in the direction of the flow.
3. Each section of pipe shall be laid true to line and grade and in such a manner as to form a close concentric joint with the adjoining pipe and to prevent sudden offsets in the flow line.
4. Pipe shall not be laid when the condition of the trench or the weather is unsuitable.

C. Debris Control:

1. The interior of the sewer pipe shall be kept clean of dirt and debris at all times. When work is not in progress, open ends of pipe and fittings shall be plugged.
2. Where clearing after laying is difficult because of small pipe size, a suitable swab or squeegee shall be kept in the pipe and bulled forward past every joint immediately after joining has been completed.

3.2 POURED-IN-PLACE CONCRETE

A. Concrete shall be mixed in accordance with applicable provisions of Section 90 of the CDT Standard Specifications.

B. Construction of concrete structures shall conform to applicable provisions of Section 51 of the CDT Standards Specifications. Unless otherwise noted herein or in the Plans, exposed surfaces of structures shall be Class 1 surface finish.

C. Curing shall conform to applicable portions in Section 90 of CDT Standard Specifications. No pigment shall be used in curing compounds. All work shall be subject to inspection. No concrete shall be placed until the Project Manager has approved the forms and reinforcement.

D. Concrete shall not be cropped freely where reinforcing bars will cause segregation, nor shall it be dropped freely more than six feet. Spouts, elephant trunks, or other approved means shall be used to prevent segregation.

3.3 PIPELINE AIR TESTING AND FLUSHING

A. All new sections of sanitary sewer shall be tested using the following procedures:

1. Test is conducted between two consecutive manholes, or as directed by the Project Manager.
2. The test section of the sewer shall be plugged at each end. One of the plugs used at the manhole shall be tapped and equipped for the air inlet connection for filling the line from an air compressor.
3. All service laterals, stubs, and fittings into the sewer test section shall be properly capped or plugged and carefully braced against the internal pressure to prevent air leakage by slippage and blowout.
4. Connect air hose to tapped plug selected for the air inlet. Connect the other end of the air hose to the portable air control equipment, which consists of valves and pressure gauges used to control the air entry rate into the sewer test section, and to monitor the air pressure in the pipeline. More specifically, the air control equipment includes a shut-off valve, pressure regulating valve, pressure reduction valve, and a monitoring pressure gauge having a pressure range from 0-5 psi. The gauge shall have minimum divisions of 0.10 psi and an accuracy of 0.40 psi.
5. Connect another air hose between the air compressor (or other source of compressed air) and the air control equipment. This completes the test equipment set-up. Test operations may commence.
6. Supply air to the test section slowly, filling the pipeline until a constant pressure of 3.5 psig is maintained. The air pressure must be regulated to prevent the pressure inside the pipe from exceeding 5.0 psig.
7. When constant pressure of 3.5 psig is reached, throttle the air supply to maintain the internal pressure above 3.0 psig for at least 5 minutes. This time permits the

temperature of the entering air to equalize with the temperature of the pipe wall. During this stabilization period, it is advisable to check all capped and plugged fittings with a soap solution to detect any leakage at these connections. If leakage is detected at any cap plug, release the pressure in the line and tighten all leaky caps and plugs. Start the test operation again by supplying air. When it is necessary to bleed off the air to tighten or repair a faulty plug, a new 5-minute interval must be allowed after the pipeline has been refilled.

8. After the stabilization period, adjust the air pressure to 3.5 psig and shut-off or disconnect the air supply. Observe the gauge until the air pressure reached 3.0 psig. At 3.0 psig, commence timing with a stopwatch until the pressure drops to 2.5 psig, at which time the stop watch is stopped. The time required, as shown on the stopwatch, for a pressure loss of 0.5 psig is used to compute the air loss.
9. If the time, in minutes and seconds, for the air pressure drop from 3.0 to 2.5 psi is greater than that shown in the following table for the designated pipe size, the section undergoing test shall have passed and shall be presumed to be free of defects. The test may be discontinued at any time.
10. If the time, in minutes and seconds, for the 0.5 psig drop is less than that shown in the following table for the designated pipe size, the section of the pipe shall not have passed the test; therefore, adequate repairs must be made and the line retested.

Requirements for Air Testing

Pipe Size (in inches)	Time Minutes	Seconds
4	2	32
6	3	50
8	5	6
10	6	22
12	7	39
14	8	56
15	9	35
16	10	12
18	11	34
20	12	30

(For larger diameter pipe use the following: Minimum time in seconds = 462 X pipe diameter in feet).

11. For 8 inch and smaller pipe, only: if, during the 5 minute saturation period, pressure drops less than 0.5 psig after the initial pressurization and air is not added, the pipe section undergoing test shall have passed.
12. Multi-pipe sizes: when the sewer line undergoing test is 8 inch or larger diameter pipe and includes 4 inch or 6 inch laterals, the figures in the table for uniform sewer main sizes will not give reliable or accurate criteria for the test. Where multi-pipe sizes are to undergo the air test, the Project Manager can compute the "average" size in inches which is then multiplied by 38.2 seconds. The results will give the minimum time in seconds acceptable for a pressure drop of 0.5 psig for the "averaged" diameter pipe.
13. Adjustment Required for Groundwater:

a. An air pressure correction is required when the ground water table is above the sewer line being tested. Under this condition, the air test pressure must be increased .433 psi for each foot the ground water level is above the invert of the pipe.

b. Where ground water is encountered or is anticipated to be above the sewer pipe before the air testing will be conducted, the following procedure shall be implemented at the time the sewer main and manholes are constructed.

i. Install a ½ inch diameter pipe nipple (threaded one or both ends, approximately 10 inch long) through the manhole wall directly on top of one of the sewer pipes entering the manhole with threaded end of nipple extending inside the manhole.

ii. Seal pipe nipple with a threaded ½ inch cap.

iii. Immediately before air testing, determine the ground water level by removing the threaded cap from the nipple, blowing air through the pipe nipple to remove any obstruction, and then connecting a clear plastic tube to the pipe nipple.

iv. Hold plastic tube vertically permitting water to rise in it to the groundwater level.

v. After water level has stabilized in plastic tube, measure vertical height of water, in feet, above invert of sewer pipe.

vi. Determine air pressure correction, which must be added to the 3.0 psig normal starting pressure of test, by dividing the vertical height in feet by 2.31. The result gives the air pressure correction in pounds per square inch to be added.

Example: if the vertical height of water from the sewer invert to the top of the water column measures 11.55 feet, the additional air pressure required would be:

$$\frac{(11.55)}{(2.31)} = 5.0 \text{ psig}$$

Therefore, the starting pressure of the test would be 3.0 plus 5 or 8.0 psig, and the ½ pound drop becomes 7.5 psig. There is no change in the allowable drop (0.5 psig) or in the time requirements established for the basic air test.

B. After the line has passed the air test, it shall be balled and flushed with water to clean. A metal screen shall be used downstream at the point of connection to the existing system to collect and remove any rock or other debris that is flushed out during cleaning.

3.4 DEFLECTION TESTING

A. Upon completion of work, perform a deflection test on entire length of installed plastic pipeline. Completed work includes superimposed loads adjacent to and over the pipeline, such as compacted backfill and earthwork, and does not include paving, concrete curbs and gutters, sidewalks, walkways, and landscaping.

B. Under external loads, deflection of pipe in the installed pipeline shall not exceed 4.5 percent of the average inside diameter of pipe.

C. Determine whether the allowable deflection has been exceeded by use of a pull-through device or a deflection-measuring device.

D. Pull-Through Device:

1. Provide a spherical, spheroidal, or elliptical ball, a cylinder, or circular sections fused to a common shaft.
   a. Circular sections shall be so spaced on the shaft that distance from external faces of front and back sections will equal or exceed diameter of the circular section.
   b. Pull-through device may also be of a design approved by the Uni-Bell Plastic Pipe Association, provided that the device meets the applicable requirements specified in this paragraph, including those for diameter of the device.
2. Ball, cylinder, or circular sections shall conform to the following:
   a. A diameter, or minor diameter as applicable, of 95 percent of the average inside diameter of the pipe; tolerance of plus 0.5 percent will be permitted.
   b. A homogeneous material throughout, with a density greater than 1.0 as related to water at 39.2 degrees F, and a surface Brinell hardness of not less than 150.

c. Center bored and through bolted with a ¼ inch minimum diameter steel shaft having a yield strength of not less than 70,000 pounds per square inch, with eyes or loops at each end for attaching pulling cables.
d. Each eye or loop shall be suitably backed with a flange or heavy washer such that a pull exerted on opposite end of shaft will produce compression throughout remote end.

3. Pull-Through Device:
   a. Pass the pull-through device through each run of pipe, either by pulling it through or flushing it through with water.
   b. If the device fails to pass freely through a pipe run, replace pipe which has the excessive deflection and completely retest in same manner and under same conditions as specified.

E. Deflection measuring Device:

1. Sensitive to 1.0 percent of the diameter of the pipe being tested and accurate to 1.0 percent of the indicated dimension.
2. Obtain approval of deflection measuring device prior to use.

F. Deflection Measuring Device Procedure:

1. Measure deflections through each run of installed pipe.
2. If deflection readings in excess of 4.5 percent of average inside diameter of pipe are obtained, retest pipe by a run from the opposite direction.
3. If retest continues to show a deflection in excess of 4.5 percent of average inside diameter of pipe, remove pipe which has excessive deflections, replace with new pipe, and completely retest in same manner and under same conditions.

G. Warranty Period Test: Pipe found to have a deflection of greater than 5 percent of average inside diameter when deflection test is performed just prior to end of 1 year warranty period shall be replaced with new pipe and tested as specified for leakage and deflection.

3.5 CLEANING

A. Thoroughly clean storm drain lines, manholes, catch basins, field inlets, culverts, and similar structures, of dirt, debris, and obstructions of any kind.

3.6 TELEVISION INSPECTION

A. After completion of the pipe installation, service connections, flushing and cleaning, and prior to placement of pavement, the sewer line shall be televised with a color closed-circuit television with tilt-head camera recorded in VHS format. The original videotape and log sheets shall be provided to the Project Manager for review.

1. The following observations from television inspections will be considered defects in the construction of sewer pipelines and will require correction prior to placement of pavement:
   a. Low spot (1 inch or greater - mainlines only).
   b. Joint separations (3/4 inch or greater opening between pipe sections).
   c. Cocked joints present in straight runs or on the wrong side of pipe curves.
   d. Chips in pipe ends.
   e. Cracked or damaged pipe.
   f. Dropped joints.
   g. Infiltration.
   h. Debris or other foreign objects.
   i. Other obvious deficiencies.
   j. Irregular condition without logical explanation

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Section 33 40 00
STORM DRAINAGE

PART 1 – GENERAL

1.1 SUMMARY

A. This section describes general requirements, products, and methods of execution relating to on-site storm drainage excluding portions within five feet of buildings unless otherwise noted. Any work within the public right-of-way shall be constructed to the standards of the local Jurisdiction, which would include one of the following: City of Fairfield; City of Vacaville; City of Vallejo; and the State of California Department of Transportation.

B. State of California Department of Transportation.

1. Storm drain piping.
2. Storm drain structures including curb inlets, catch basins, area drains, and manholes.
3. Storm drain outfalls.
4. Culverts and headwalls.
5. Storm drain pump station.

C. Contractor shall provide all labor, equipment, and materials, unless otherwise noted.

D. Related Sections:

1. Section 02315 – TRENCHING, BACKFILLING, AND COMPACTING.

1.2 SUBMITTALS

A. Comply with the requirements of Section 01330 – SUBMITTAL PROCEDURES.

B. Product Data: Manufacturer's literature and data, including, where applicable, pressure rating, capacity, labels, or other markings on equipment made to the specified standards for materials, for the following:

1. Piping and fittings.
2. Jointing material.
3. Gaskets, couplings, and sleeves.
4. Precast concrete structures, including manholes and drainage inlets.
5. Concrete mix design for precast and cast-in-place structures.
6. Manhole lids and frames.
7. Manhole steps.
8. Pipe to Structure Connection Seal
9. Drainage inlet and area drain grates and frames.
10. Pump station vaults.
11. Pump data.

1.3 QUALITY ASSURANCE

A. Comply with the latest editions of the following Standards and Regulations:

1. American Society for Testing and Materials (ASTM).
   a. A74: Cast Iron Soil Pipe and Fittings.
   b. A615: Deformed and Plain Billet-Steel Bars for Reinforcement.
   c. B32: Solder Metal.
   d. C76: Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
   e. C150: Portland Cement.
   f. C478: Precast Reinforced Concrete Manhole Sections.
   g. C494: Chemical Admixtures for Concrete.
   h. C920-02: Elastomeric Joint Sealants.
   i. D2241-00: Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
   j. D2680-01 Acrilonitrile-Butadiene-Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Composite Sewer Piping.
   k. D2729: Perforated PVC Drain Pipe.
   l. D3034-00: Type PSM Polyvinyl Chloride (PVC) Sewer pipe and Fittings.
   m. F1336-02: Poly(Vinyl Chloride) (PVC) Gasketed Sewer Fittings.
2. California Department of Transportation (CDT): Standard Specifications:
   a. Section 51: Concrete Structures
   b. Section 52: Reinforcement
   c. Section 55: Steel Structures
   d. Section 66: Corrugated Facilities
   e. Section 70: Miscellaneous Metal
   f. Section 72: Slope Protection
   g. Section 75: Miscellaneous Metal
   h. Section 90: Portland Cement Concrete
3. City of Fairfield Standard Plans and Specifications.
4. City of Vacaville Standard Plans and Specifications.
5. City of Vallejo Standard Plans and Specifications.
6. American Association of State Highway and Transportation Officials (AASHTO) for H20 Loading.
7. American Concrete Institute (ACI).
8. Other authorities having jurisdiction.

B. System Description: Grades and elevations are to be established with reference to the benchmarks referenced on the Plans.

PART 2 – PRODUCTS

2.1 PIPING

A. Polyvinyl Chloride (PVC) Pipe: PVC pipe conforming to ASTM D3034, SDR 35 with bell-and-spigot type of rubber gasket joints. Bells shall be integral with pipe. Spigot end pipe with separate double hub couplings is not acceptable.

B. Reinforced Concrete Pipe (RCP): RCP shall conform to ASTM C76 with tongue-and-groove or bell-and-spigot joints. Unless indicated otherwise on the plans, all reinforced concrete pipe shall be Class III, 1350-D pipe.

C. High-Density Polyethylene (HDPE) Pipe: HDPE pipe conforming to ASTM D3212, or ASTM 1417 for pipe sizes four inch - 60 inch (ADS N-12 1B WT pipe or equivalent).

2.2 MANHOLES

A. Manholes shall be pre-cast concrete of the size and shape shown on the Drawings and shall conform to Sections 70-1.02H of the CDT Standard Specifications and to ASTM C478. Equivalent poured-in-place structures may be used at the Contractor's option. Concrete shall consist of Caltrans Type I/II cement.

B. Frames and covers shall be cast iron conforming to Section 55-2.03 and 75-1.02 of the CDT Standard Specifications. Manhole covers shall have the words "STORM DRAIN" in letters not less than 2-inches cast into the cover. The clear opening for all manhole covers shall be 24 inches.

C. All interior concrete surfaces shall be coated with "Xypex Crystalline" or equal. Use of a water-resistant admix is acceptable, at Contractor option.

D. Frames and grates for manholes and catch basins shall be match-marked in pairs before delivery to the job site. The grates shall fit into their frames without rocking. Grates shall have a maximum opening of one-half inch between bars, unless otherwise noted in the Plans.

E. Reinforcing Bars: Reinforcing bars shall be of intermediate grade billet steel conforming to ASTM A615 and shall be of the size shown on the Standard Details or in the Drawings. Bars shall be of the round deformed type, free from injurious seams, flaws, or cracks, and shall be cleaned of all rust, dirt, grease and loose scales.

F. Portland Cement Concrete: Concrete for manhole bases, inlets, and other concrete structures shall conform to the requirements of CDT Section 90 and as herein specified. The concrete shall be Class "2" containing at least six (6) sacks of Portland Cement per cubic yard of concrete. The grading of the combined aggregate shall conform with the CDT requirements of the three-quarter inch maximum. The consistency of the fresh aggregate shall be such that the slump does not exceed four inches, as determined by Test Method No. Calif. 520. The concrete shall have a minimum design compressive strength of 3,000 psi after 28 days.

2.3 PIPE TO STRUCTURE CONNECTOR/SEAL

A. A flexible pipe to manhole connector shall be used for all pipe penetrations and/or cast-in-place concrete structures.

1. The seal shall provide a flexible, positive, watertight connection between pipe and concrete wastewater structures. The connector shall assure that a seal is made between (1) the connector and the structure wall, and (2) between the connector and the pipe. The seal between the connector and the manhole wall shall be made by casting the connector integrally with the structure wall during the manufacturing process in such a manner that it will not pull out during coupling. The seal between connector and pipe will be made by way of a stainless steel take down band compressing the gasket against the outside diameter of the pipe.

   a. The connector shall be molded from materials whose physical/chemical properties meet or exceed the physical/chemical resistant properties outlined in ASTM C-923. The connector and stainless steel hardware shall meet or exceed the performance requirements proscribed in ASTM C-923.

   b. The connector shall be of size specifically designed for the pipe material being used and shall be installed in accordance with recommendations of the manufacturer.

2. Connectors shall be Z-LOK or G3 connectors manufactured by A-LOK Products Inc. or approved equivalent.

2.4 AREA DRAINS

A. Grate and Riser: Area drain shall be ADS model 2718 AG or approved equal. Riser shall be constructed of 6-inch PVC SDR 35 piping per paragraph 2.1(A) of this section and connected to area drain by a gasket joint. Riser shall be vertical except as otherwise noted in the plans. Riser may include a reducer if necessary to make connection to the storm drain line.

B. Elevation and Grading: Area Drain rim elevation shall be set and area around area drain shall be graded to drain away from any adjacent structures, walks, or roadways and towards area drain.

2.5 CLEAN-OUTS

A. A valve box shall be provided for each clean-out. Boxes shall be pre-cast concrete with cast iron frame and cover marked "STORM DRAIN"; Christy G5 with G5C lid or approved equivalent.

2.6 CULVERT AND OUTFALL HEADWALLS

A. All headwalls shall be constructed in conformance with CDT Standard Plans as indicated.

PART 3 – EXECUTION

3.1 PIPE INSTALLATION

A. Pipe shall be installed in conformance with Section 02315, and manufacturer's recommendations.

B. Pipe laying:

1. No pipe shall be laid until the Geotechnical Engineer inspects and approves the conditions of the bottom of the trench.
2. Pipe laying shall proceed "up grade" with the spigot section of the bell-and-spigot pipe pointing in the direction of the flow.
3. Each section of pipe shall be laid true to line and grade and in such a manner as to form an close concentric joint with the adjoining pipe and to prevent sudden offsets in the flow line.
4. Pipe shall not be laid when the condition of the trench or the weather is unsuitable.

C. Debris Control:

1. The interior of the storm pipe shall be kept clean of dirt and debris at all times. When work is not in progress, open ends of pipe and fittings shall be plugged.
2. Where clearing after laying is difficult because of small pipe size, a suitable swab or squeegee shall be kept in the pipe and pulled forward past every joint immediately after joining has been completed.

3.2 POURED-IN-PLACE CONCRETE

A. Concrete shall be mixed in accordance with applicable provisions of Section 90 of the CDT Standard Specifications. Concrete shall consist of Type I/II cement.

B. Construction of concrete structures shall conform to applicable provisions of Section 51 of the CDT Standards Specifications. Unless otherwise noted herein or in the Drawings, exposed surfaces of structures shall be Class 1 surface finish.

C. Curing shall conform to applicable portions in Section 90 of CDT Standard Specifications. No pigment shall be used in curing compounds. All work shall be subject to inspection. No concrete shall be placed until the Project Manager has approved the forms and reinforcement.

D. Concrete shall not be cropped freely where reinforcing bars will cause segregation, nor shall it be dropped freely more than six feet. Spouts, elephant trunks, or other approved means shall be used to prevent segregation.

3.3 PIPELINE FLUSHING

A. Newly constructed storm drain pipes shall be flushed with water to clean. A metal screen shall be used to collect and remove any rock, silt and other debris that is flushed out during cleaning.

3.4 DEFLECTION TESTING

A. Upon completion of work, perform a deflection test on entire length of installed plastic pipeline. Completed work includes superimposed loads adjacent to and over the pipeline, such as compacted backfill and earthwork, and does not include paving, concrete curbs and gutters, sidewalks, walkways, and landscaping.

B. Under external loads, deflection of pipe in the installed pipeline shall not exceed 4.5 percent of the average inside diameter of pipe.

C. Determine whether the allowable deflection has been exceeded by use of a pull-through device or a deflection-measuring device.

D. Pull-Through Device:

1. Provide a spherical, spheroidal, or elliptical ball, a cylinder, or circular sections fused to a common shaft.
   a. Circular sections shall be so spaced on the shaft that distance from external faces of front and back sections will equal or exceed diameter of the circular section.
   b. Pull-through device may also be of a design approved by the Uni-Bell Plastic Pipe Association, provided that the device meets the applicable requirements specified in this paragraph, including those for diameter of the device.
2. Ball, cylinder, or circular sections shall conform to the following:
   a. A diameter, or minor diameter as applicable, of 95 percent of the average inside diameter of the pipe; tolerance of plus 0.5 percent will be permitted.
   b. A homogeneous material throughout, with a density greater than 1.0 as related to water at 39.2 degrees F, and a surface Brinell hardness of not less than 150.
   c. Center bored and through bolted with a ¼ inch minimum diameter steel shaft having a yield strength of not less than 70,000 pounds per square inch, with eyes or loops at each end for attaching pulling cables.
   d. Each eye or loop shall be suitably backed with a flange or heavy washer such that a pull exerted on opposite end of shaft will produce compression throughout remote end.
3. Pull-Through Device:
   a. Pass the pull-through device through each run of pipe, either by pulling it through or flushing it through with water.
   b. If the device fails to pass freely through a pipe run, replace pipe which has the excessive deflection and completely retest in same manner and under same conditions as specified.

E. Deflection measuring Device:

1. Sensitive to 1.0 percent of the diameter of the pipe being tested and accurate to 1.0 percent of the indicated dimension.
2. Obtain approval of deflection measuring device prior to use.

F. Deflection Measuring Device Procedure:

1. Measure deflections through each run of installed pipe.
2. If deflection readings in excess of 4.5 percent of average inside diameter of pipe are obtained, retest pipe by a run from the opposite direction.
3. If retest continues to show a deflection in excess of 4.5 percent of average inside diameter of pipe, remove pipe which has excessive deflections, replace with new pipe, and completely retest in same manner and under same conditions.

G. Warranty Period Test: Pipe found to have a deflection of greater than 5 percent of average inside diameter when deflection test is performed just prior to end of 1 year warranty period shall be replaced with new pipe and tested as specified for leakage and deflection.

3.5 CLEANING

A. Thoroughly clean storm drain lines, manholes, catch basins, field inlets, culverts, and similar structures, of dirt, debris, and obstructions of any kind.

3.6 TELEVISION INSPECTION

A. After completion of the pipe installation, service connections, flushing and cleaning, and prior to placement of pavement, the storm drainage line shall be televised with a color closed-circuit television with tilt-head camera recorded in VHS format. The original videotape and log sheets shall be provided to the District.

1. The following observations from television inspections will be considered defects in the construction of sewer pipelines and will require correction prior to placement of pavement:
   a. Low spot (1 inch or greater - mainlines only).
   b. Joint separations (3/4 inch or greater opening between pipe sections).
   c. Cocked joints present in straight runs or on the wrong side of pipe curves.
   d. Chips in pipe ends.
   e. Cracked or damaged pipe.
   f. Dropped joints.
   g. Infiltration.
   h. Debris or other foreign objects.
   i. Other obvious deficiencies.
   j. Irregular condition without logical explanation.

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Section 33 50 00
NATURAL GAS DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes general requirements, products, and methods of execution relating to on-site natural gas piping serving all buildings and structures. Unless otherwise noted, this section does not apply to natural gas systems, equipment and appurtenances, inside and within 5 feet of buildings.

B. Contractor shall provide all labor, equipment, materials, and testing services unless otherwise noted.

C. Related Sections:

1. Section 31 23 33 – TRENCHING, BACKFILLING AND COMPACTING

1.2 SUBMITTALS

A. Comply with requirements of Section SUBMITTAL PROCEDURES.

B. Product Data: Manufacturer's literature and data, including, where applicable, sizes, pressure rating, rated capacity, listing/approval stamps, labels, or other markings made to the specified standards, for the following:

1. Piping and fittings.
2. Gaskets, couplings, sleeves, and assembly bolts and nuts.
3. Gate valves and ball valves.
4. Valve boxes, frames and covers.
5. Meter boxes, frames and covers.
6. Tapping sleeves and tapping valves.
7. Service saddles and corporation stops.
8. Identification materials and devices.

C. Shop Plans and Calculations: None required.

D. Test Reports: Provide as necessary.

1.3 QUALITY ASSURANCE

A. Comply with the latest edition of the following Standards and Regulations:

1. Pacific Gas & Electric Company Standard Specifications and Plans.
2. State of California Public Utilities Commission Requirements.
3. American Society of Testing and Materials (ASTM).
   a. ASTM D2513 Thermoplastic Gas Pressure Pipe, Tubing and Fittings.
   b. ASTM D2683 Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.
   c. ASTM D3139 Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
   d. ASTM D3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
   e. ASTM D3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
   f. ASTM F477 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
   g. ASTM F1055 Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing.
   h. ASTM F1056 Standard Specification for Socket Fusion Tools for Use in Socket Fusion Joining Polyethylene Pipe or Tubing and Fittings.
   i. ASTM A53/A53M Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   j. ASTM A795 Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.
   k. ASTM A865 Standard Specification for Threaded Couplings, Steel, Black or Zinc-Coated (Galvanized) Welded or Seamless, for Use in Steel Pipe Joints.
   l. ASTM B88 Standard Specification for Seamless Copper Water Tube.
4. Plastics Pipe Institute (PPI)
   a. Underground Installation of Polyethylene Pipe.
   b. Polyethylene Joining Procedures.
   c. Inspections, Test and Safety Considerations.
5. American Association of State Highway and Transportation Officials (AASHTO) for H20 Loading
6. American Concrete Institute (ACI)
   a. ACI 348 - Meter Pit Construction
7. Other authorities having jurisdiction.

B. System Description: Grades and elevations are to be established with benchmarks referenced on Plans.

C. All testing of systems specified in this section shall be witnessed by representatives of the inspector or local authority. Provide at least 7 days notice.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Piping:
1. Schedule 40 steel pipes, with malleable iron fittings.
   a. Maximum service pressure of pipe shall be 125 psi.
   b. Maximum service temperature of pipe shall be 250 degrees F.
   c. Provide Teflon® tape pipe joint compound as sealant on all pipe threads.
2. Polyethylene 2406 piping, with PE fittings.

B. Protective Coating for Underground Steel Pipe: Provide extruded polyethylene sheath, manufactured by Amstead "Plexco."

1. Provide yellow color Federal Specification L-C-530.
2. Provide sealed fittings and couplings sealed using heat-cured sheath shrunk in place, Raychem "Thermofit" sleeves.

C. Provide shutoff valve at the point of connection where the new gas service connects to the existing underground service stub.

D. Valve Box: For each valve, provide concrete boxes as specified in Section 02510, WATER SYSTEMS, except that cover shall have cash letters reading "Gas".

E. Valves: Provide UL approved and listed ball valves with threaded ends and level handle.
1. Acceptable manufacturers: Worcester “Econo-Miser” or Hills-McCanna.
2. Equivalent products will be considered when submitted in accordance with “Substitutions” as specified in Section 01600 - PRODUCT REQUIREMENTS.

F. Provide 2-inch wide yellow warning tape reading “Caution Medium Pressure Gas Buried Below”.

2.2 MATERIALS

A. Polyethylene (PE) Pipe: All plastic pipe installed shall be medium density PE 2406 TR-418 “GAS” pipe manufactured in accordance with the latest listed edition of ASTM D-2513. All pipes will be supplied in straight 40 feet lengths. All PE-to-PE connections shall be Butt Fusion Type made in the presence of a qualified inspector.

B. Polyethylene (PE) Fittings: All plastic fittings shall be medium density PE 2406, TR-418 “GAS” fittings manufactured in accordance with the latest listed edition of ASTM D-2513 and ASTM D-3261. All fittings shall have Butt End outlets.

C. Polyethylene (PE) Valves: All plastic valves shall be medium density PE 2406, TR-418 “GAS” valves manufactured in accordance with the latest listed edition of ASTM D-2513 and ASTM D-3261. All valves shall have Butt End outlets.

D. Pipe Scratches or Cuts: Pipe that has scratches, notches, cuts or any other abrasions that exceed 10% of the pipe wall thickness shall not be used on the project and shall be disposed of. The Contractor shall inspect all pipes and reject any pipe that has scratches exceeding 10% of the pipe wall thickness. The Contractor will be responsible for the cost of all defective or damaged pipe that he accepts, costs will be deducted from payments. The Contractor shall use pipe stands, spooling devices, or other means to avoid damaging the pipe during installation. The Contractor shall observe the pipe during installation for scratches, gouges or other defects. If defects are present, the Contractor shall remove and discard the damaged section of pipe.

E. Minimum Bending Radius: The minimum bend radius for plastic pipe is twenty times the outer diameter. The Contractor shall not bend plastic pipe to a radius less than twenty times the outside diameter of the pipe. Fittings shall not be installed in pipe that is bent or curved to conform to trench dimensions.

F. Tracer Wire: Tracer wire shall be attached to the pipe with all non-metallic electric tape at intervals not exceeding 3 feet. All connections between tracer wires shall be made with the split bolt connectors and wrapped with electric tape. See Section 02315 for specifications of tracer wire.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces of site and work area for suitable conditions where gas service is be installed.

B. Do not begin installation until unsatisfactory conditions have been corrected.

3.2 ABANDONMENT OF EXISTING UNDERGROUND PIPE

A. Existing gas pipe to be abandoned in place shall be capped at each end, evacuated of all natural gas, pressure tested per section 2.4B, and pressurized with nitrogen gas to a pressure not less than 5 PSIG.

3.3 INSTALLATION

A. Provide protective covers having an extruded polyvinyl chloride outer coating for underground pipe and fittings.
1. Provide “Thermofit” fitting sleeves shrunk in place over joints and fittings after welding and testing of piping.
2. As an option, provide 2-layer wrap of 3M No. 53, 10-mil thickness tape.

B. Depth of Cover for Underground Piping: 2-foot, 6-inches minimum.

C. Sand Encasement:
1. For protective-coated pipe, provide 3-inch minimum thickness of clean, washed and graded building sand.
2. Apply after all coatings have been finished.

D. Installation shall conform to ANSI B31.8.

E. Location of Service Piping: Service pipe shall enter building wall in areaway or above ground.

F. Provide backfill and compaction of trenches as specified in Section 02300 - EARTHWORK AND GRADING.

3.4 FIELD QUALITY CONTROL

A. Blowing Out Piping:
1. Blow out piping with air immediately prior to pressure testing.
2. The flow shall be a velocity of at least 100 feet per second.
3. Blow out piping for at least 20 minutes and continue until the effluent is clear and contains no visible particulate matter.

B. Field Tests:
1. Tests shall conform to requirements in ANSI B31.8; conduct tests prior to backfilling.
2. Air pressure test shall be at a pressure of 100 psig, duration 30 minutes minimum.
3. The Inspector of Record shall witness all field tests.
4. Conduct tests, providing labor, equipment and incidentals required for testing. If any failure occurs during testing, provide replacements as directed by the Project Manager and repeat tests until satisfactory installation and operation are achieved.

C. May conduct and provide report of 12,000V Tinker Riser Test.

End of Document

Telecomm Standards

DESIGN STANDARD FOR TELECOMMUNICATIONS

Purpose:

The purpose of this document is to standardize the basic elements of the telecommunications systems design process. The design standard has the purpose of creating a consistent application of telecommunications systems design throughout the Solano Community College (SCC) District, therefore achieving a standard of quality for maintenance and reliability throughout all renovation and new building projects. This standard serves as a supporting document part of the overall Solano Community College Technology Plan (2013-2015). Deviations from this standard shall be approved by SCC.

Telecommunications Systems-Related Support Staff and Committees:

Chief Technology Officer
Director, Technology Services & Support
Desktop Services
Network Services
The Strategic Technology Advisory Committee (STAC)

Design Standard:

I. TELECOM IDF/MDF ROOMS

A. Minimum size of the IDF is to be 8’ x 9’.

B. Minimum size of the MDF is to be 10’ x 13’ and shall not be co-located with electrical equipment due to EMI-mechanical noise transmitted from the electrical equipment.

C. IDF should have a hard ceiling for security purposes.

D. IDF/MDF rooms should not have any water sprinklers in the room.

E. Room must be well lit. Lighting fixtures shall be coordinated with any horizontal cable tray or other ceiling mounted equipment.

F. No equipment other than that related to the voice/data network should be located in the IDF’s/MDF’s. This includes but not limited to FACP, lighting control equipment, electrical panels, EMS, etc.

G. Regular 110v receptacles should be located at standard locations around the room.

H. Some form of standalone air conditioning must be provided to adequately cool the space when fully equipped. Cooling capacity shall be calculated taking into account all equipment planned for the room. Rooms should not be on building Air system. Wall or floor mounted AC equipment preferred. In no case shall AC equipment be located above IT equipment racks. Roof mounted package units are also acceptable for single story buildings or IDF Rooms located on the top floor of a multi-storied building.

I. There should be 3’ of clear space on all 4 sides of the 2’ x 3.25’ cabinet. If necessary for placement of an additional cabinet or future placement of an additional cabinet this requirement can be modified to 3’ of clear space in the front, rear and one side of the cabinet.

J. Access to IDF/MDF to be by electronic key card or keypad, and only Technology Services & Support staff is to be issued access cards or codes. In cases where an IDF is shared with Maintenance & Operation (M&O), only essential M&O staff is to have access to the IDF/MDF (i.e. Engineers, Director, and Assistant Director). Before issuing an access card or code to anyone for any IDF/MDF the Director of Technology Services & Support must be consulted.

K. Where possible, doors to the IDF/MDF should not have windows or signage other than room numbers (for security purposes). If IDF/MDF doors must have windows, windows are to be blacked out.

L. A phone is to be located on one wall of the IDF/MDF room, typically on the door wall.

II. CABINETS

A. Refer to the document SCC – TSS Telecommunications Cabling Materials List for standard cabinet models and accessories (fan kit).

B. Secure cabinet(s) to floor utilizing CPI brackets and drop-in anchors.

C. Secure top of cabinet(s) utilizing appropriate size ladder rack attached to cabinet with CPI elevation kits.

D. Install CPI vertical wire managers and fan-kits to cabinet. Fans shall be connected to power and operational.

E. Install cabinet provided vertical wire management @ rear of cabinet.

F. Install square punched rails in cabinet; contractor to provide necessary cage nuts and mounting screws for all equipment being installed in rack.

G. Install hardware in cabinet based on 1. = top U holes:

1. Fiber LIU (with single-mode fiber terminated first left to right and then followed by MM). LIU shall be installed in the top 1U of the cabinet

2. Wire management shall be installed on the sides of the patch panels as well as between each Data/ Voice patch panel

3. Data patch panel(s) shall be KRONE CAT 6 and 568B compliant

4. Copper cable (CAT3) terminated on patch panel. All data patch panels shall be terminated first, and then the CAT 3 cable shall be terminated on a voice patch panel at the end of the data patch panel sequence. There shall be one pair per port (termination on the White/Blue pair for voice) with the Violet/Slate pair un-terminated and left as a spare.

5. District supplied network switches

6. District supplied UPS

7. District supplied PDU (extra outlets for equipment)

H. Two dedicated electrical outlets (30 amp w/L5-30R receptacles) to be installed inside the top of each rack, near the back.

I. Customer provided UPS power cord will be run from UPS on floor of cabinet through rear vertical wire manager to electrical outlet.

III. BACKBOARD LAY-OUT

A. Refer to the document SCC – TSS Telecommunications Cabling Materials List for standard cabling materials.

B. Backboard: 4’ X 8’ X 3/4” plywood should be installed on only one wall (to be determined by cabinet position)

C. Backboard shall be installed starting 4” above the finished floor, shall be fire-rated plywood painted white. Fire rated sticker shall not be painted over.

D. Copper feed cable is to be terminated in appropriate sized protected terminal (50pr, 100pr etc.). Terminal is to be grounded to bus bar.

E. CAT3 copper cable to be terminated on “out” of protected terminal to patch panel in cabinet. (routed overhead on ladder rack)

IV. CABLING & CABLE ROUTING

A. Refer to the document SCC – TSS Telecommunications Cabling Materials List for standard cabling materials.

B. All drop cables routed into MDF/IDF to be installed through appropriate sized sleeves with bushings.

C. All drop cables to be “split out” by number (ie; 1-12, 13-24) and brought into cabinet on opposing sides of patch panel.

D. All cables will be tested for compliance (using MicroTek or similar device) with results provided to district in printed and in an electronic form acceptable to the district.

E. All ladder rack to be grounded to provided bus bar.

F. Labeling standard is Room#-drop (i.e. 128-10) number starting in left corner of room and moving clockwise around room. Drops number are sequential from room to room (i.e. 128-20, 129-21, etc.).

G. All cables to be terminated 568B.

H. All phone connectivity is to be VOIP with all cables to be ADC blue CAT6.

I. Customer/Architect to determine PVC vs. plenum rated cable.

J. ADC faceplate and jack insert color is typically Ivory.

K. Cable numbering to be determined by sequence: floor, closet #, drop number. Two drop locations to be labeled 1/2 and three plus drop locations to be labeled 1-3. Example: 1st floor closet # 1 would read: 1.1.1/2 or 1.1.1-3.

L. All fiber required to be extended shall match existing hybrid fiber count.

M. All fiber will be tested using OTDR with results provided to district in printed and in an electronic form acceptable to the district.

N. Extended fiber shall be fusion spliced in approved fiber splice case.

O. Single mode patch cords are to be installed from fiber LIU to fire panel. Alarm vendor will plug in @ panel.

P. Copper cable required to be extended can “splice thru” on A110 blocks.

Q. All cabling should be routed according to industry standards and supported in cable hangers or cable trays.

R. Cable hangers will not be attached to ceiling tie wires. The first choice by cabling vendor will be to install their own wires or wall mount hangers. Where this is not possible due to existing conditions, there may be existing wires that are unattached to the grid or utilized for other mechanical support that can be utilized.

S. Industry standards apply to fire stop installation and will be dictated by field conditions.

T. Phones are to be co-located with data and terminated on patch panel in cabinet

U. Need data runs for HVAC (copper) and fire alarms (fiber). A cat 6 drop must be placed near the HVAC controller. A fiber patch cable must be run in conduit from the FACP location to the IDF.

V. Standard is Cat6 cabling

W. Cabinet as well as station patch cords are to be provided by contractor in lengths and quantities as specified by customer (usually the number of ports terminated for cabinet quantity– 3’& 7’ lengths).

X. Standard drop count for an employee work location is 3 drops. Standard drop count for a student station is 1 drop plus 1 printer drop for every 20 computers.

Y. Standard materials are to be used as listed on the Solano Community College - Technology Services & Support Telecommunications Cabling Materials List.

Z. All building projects must include above ceiling cabling for installation of PoE wireless access points.

AA. Electronic and printed forms of as built drawings must be provided to IT.

BB. All newly installed cabling must be tested and performance test results shall be submitted to SCC IT.

V. WIRELESS NETWORK

A. All building projects must include installation of wireless access points to cover the interior of the building (location diagram will be supplied by district).

B. All interior wireless access points are Power over Ethernet (PoE) and therefore DO NOT require a power receptacle to be placed near the access point device.

C. All exterior wireless access points have an external antenna and the device MAY REQUIRE a power receptacle to be located in close proximity to the device. Coordinate requirements with SCC IT.

D. Wireless access points require a Cat6 cable terminated with an RJ45 connector in a biscuit box to be located per the district supplied drawings and routed to the IDF/MDF. Every effort should be made to keep the wireless access point cables to be terminated in a group on the patch panel and clearly identified. Cabling and termination is vendor supplied (i.e. patch panels, biscuit box, etc.).

E. Access points are to be mounted per manufacturer supplied instructions and are generally surface mounted on the ceiling at district specified locations. Actual placement can vary slightly depending on conditions at the specified locations.

F. All cabling to access points are to be tested per industry standards.

G. All wireless access points are district supplied/contractor installed.

VI. PHONES

A. All phones are to be VoIP phones except where analog lines are necessary (i.e. emergency phones, fax lines, etc.).

B. District standard VoIP phones are CISCO brand.

C. All VoIP phones plug into CISCO PoE (Power over Ethernet) switches.

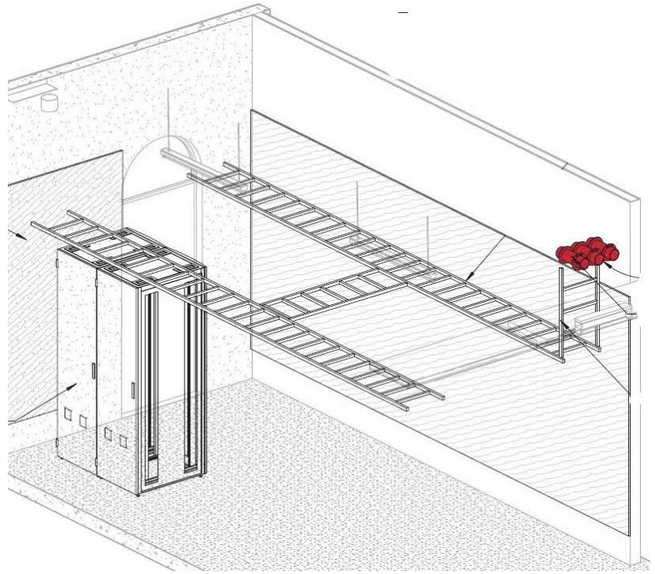
D. Lines for emergency equipment (emergency phones, fire alarms, security alarms, etc.) are to be 1MB’s provided by the district’s Telco carrier and NOT part of the district phone system.

E. Each building is to have wall mounted courtesy/emergency phones in each hallway.

VII. ACCESS TO TELECOM SPACES

A. Contractors shall contact SCC IT for proper badging and access to telecom spaces. Request for access shall be submitted in writing and follow the District’s guidelines and procedures.

Typical IDF Room Layout



Approved Manufacturers:

Equipment Racks and Cabinets:

1. Middle Atlantic Products
2. CPI – Chatsworth Products
3. Panduit

Wireless Access Points:

1. Refer to SCC IT for list of approved manufacturers

Copper Patch Panels:

1. Panduit
2. Siemen

Fiber Patch Panels:

1. Panduit
2. Siemen

Category Cable / Patch Cords:

1. General Cable
2. Mohawk
3. Berk-Tek

Fiber Cable / Patch Chords:

1. General Cable
2. Mohawk
3. Berk-Tek

Wire Managers:

1. Middle Atlantic Products
2. CPI – Chatsworth Products
3. Panduit

Ladder Rack / Cable Tray:

2. Refer to SCC IT for list of approved manufacturers

Substitutes Allowed:

All substitutions must be approved by SCC IT. Requests for substitutions must be submitted in writing prior to design, purchase, and installation.

Associated Design Standards and Construction Specifications

Standards
EIA/TIA-568 Commercial Building Telecommunications Wiring Standard
TIA-569 Telecommunications Pathways and Spaces
TIA-607 Generic Telecommunications Bonding and Grounding for Customer Premises
TIA-942 Telecommunications Infrastructure Standard for Data Centers
ANSI/NECA/BICSO-56-2006 Standard for Installing Commercial Building Telecommunications Cabling
ANSI/NECA/BISCI-607 Telecommunications Bonding and grounding Planning and Installation Methods for Commercial Buildings
ANSI/BICSI-002 Data Center Design Standard and Recommended Practices

Specifications
270500 COMMON WORK RESULTS FOR COMMUNICATIONS
271100 COMMUNICATIONS EQUIPMENT ROOM FITTINGS
271300 COMMUNICATIONS BACKBONE CABLING
271500 COMMUNICATIONS HORIZONTAL CABLING

Audio Visual Standards

DESIGN STANDARD FOR AUDIOVISUAL SYSTEMS

General:

Solano Community College (SCC) is intent on moving to 21st century unified communications and data systems, consistent with industry standards and best practices as they evolve. To that end all SCC Audio/Visual (AV) will be digital (unless laws or codes specify otherwise) and/or will be digitally controlled through an enterprise management system, and be tightly integrated into the data components of the SCC Technology plan.

Purpose:

The purpose of this document is to standardize the basic elements of the audiovisual systems design process, and to guide AV to the integrated solutions envisioned above. This Design Standard has the purpose of creating a consistent application of AV systems design throughout the Solano Community College District, therefore achieving a standard of quality for maintenance and reliability throughout all renovation and new building projects. This standard serves as a supporting document to the Solano Community College Technology Plan. Any deviations from this standard ***must*** be approved by SCC Information Technology (IT) Management.

Background of Audiovisual Systems within the District:

Audiovisual Systems cover both instructional and informational AV technology. Instructional AV technology covers systems that support teaching, learning, and research. Students and staff members use this technology in pursuit of the College's educational goals. Informational AV technology covers the digital signage systems deployed around the College. Students and staff members use this technology to share content with the different audiences that may occupy the spaces within the College.

For the purposes of this document the instructional AV technology will be referred to as AUDIOVISUAL SYSTEMS. Informational AV technology will be referred to as DIGITAL SIGNAGE SYSTEMS.

Audiovisual Systems-Related Support Staff and Committees:

Chief Technology Officer
Director, Technology Services & Support
Desktop Services
Network Services
Strategic Technology Advisory Committee (STAC)

Design Standard:

Smart Classroom General Descriptions

Audio/Video (A/V) Cabinet:

- Located next to wall adjacent to teaching wall 5' from teaching wall corner.
- 2" Conduit from ceiling to a recessed A/V wall plate behind A/V cabinet location.
- Refer to Page 4 of this document for conceptual drawing
- In certain situations, the room configuration may dictate the elimination or repositioning of the A/V Cabinet. Elimination/Repositioning of cabinet **must** be coordinated with SCC IT Management.
- Equipment purchase, cabinet construction and installation to be accomplished by SCC IT.

Lighting:

- Shall be coordinated for appropriate levels related to room functions.
- Lighting controls, if control system is installed, can be controlled via the District's A/V control system.
- Lighting controls ***must*** be configured so that lights ***directly over the teaching wall*** can be dimmed or turned off independently of the other lights in the room for maximum viewing capability.
- Industry standards and guidelines shall be followed.
- Refer to Codes & Standards section of this document for a list of related standards.

Power requirements:

- (1) Single gang dual power outlet ***above the ceiling*** at the projector location or ***behind*** TV in a recessed box.
- (2) Single gang dual power outlets at the A/V cabinet. (1) to be at the table top height of Cabinet and (1) below/behind cabinet, within a ***recessed box***.
- Refer to Page 4 of this document for conceptual drawing

Data requirements:

- (1) 4-port wall jack, in a recessed box, below/behind cabinet next the single gang power outlet noted above.
  - Data cables to be run to IDF/MDF within the building
  - Data ports should be labeled as per the District labeling standard detailed in the SCC Telecom Standards Guideline.
- (2) Cat 6 (shielded) to be run and terminated from a wall jack, within a recessed box, located next to the 4-port data plate at the smart cabinet location to the Projector/TV location.
- Refer to Page 4 of this document for conceptual drawing.

Audio requirements:

- (2) Audio wires (proper gauge for installed speakers) to be run from AV wall plate, within a recessed box, at the smart cabinet location to the speaker locations within the room. Consult with district IT for location of speakers.
  Note: Audio terminations at wall plate to be coordinated with District IT.
- Refer to Page 4 of this document for conceptual drawing

Projection screens:

- May be motorized or manual roll up and shall be sized appropriately for the room size and desired coverage areas.
- Motorized screens shall be used in areas in which the screen sizes are larger than 12 ft., typically Large Lecture, Multipurpose rooms and Cafeterias.
- Motorized screens to be programmed and controlled via the A/V control console if possible.
- Smaller screens shall be manual roll up.
- Screens are to be centered on teaching wall mounted no more than 6” below the ceiling (in rooms with normal ceiling heights).
- Screens to be purchased by District IT and installed by A/V contractors.

Screen mounts:

- Must have backing of sufficient size to support size of screen.
- Mounts to be purchased by District IT and installed by A/V contractors.

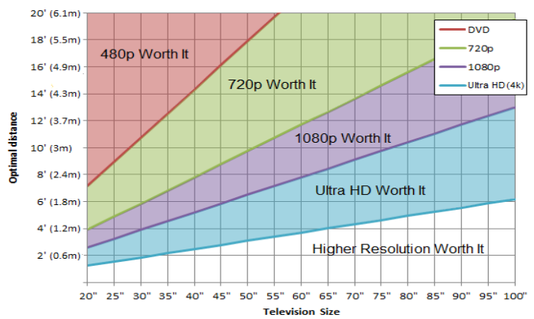
Projectors:

- Shall be industry standard High Definition, with HDMI and Internet Protocol (IP) input, native 16:9 format.
- Mounted at an appropriate distance from screen so as to take up as much screen space as possible. Coordinate with District IT prior to mounting.
- Projector mount may have to be offset 3.5” right of screen as viewed from the screen location to accommodate for the offset of the projector lens (If Lens is not center of projector). Coordinate with District IT prior to installation.
- Care should be taken to **NOT** place anything in the projection path (i.e. lights, art work hangers etc.)
- Projectors to be purchased by District IT and installed by A/V contractors.

Television:

- Industry standards should be followed when determining the correct size of the room. The chart below can assist with determining screen size. A/V Consultant in conjunction with District IT will determine appropriate size for room.

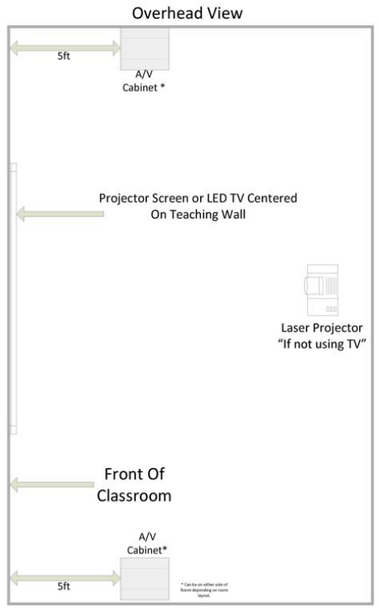
Optimal viewing distance by the size of the television and the resolution

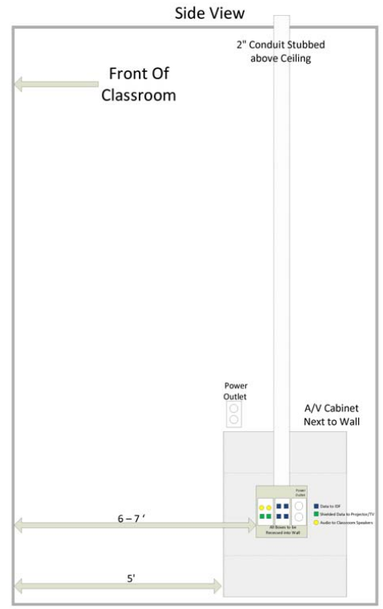


Television: (cont)

- Proper backing for the TV must be installed for TV locations.
- TV’s should at a minimum have (3) HDMI and (1) RS-232 connections.
- Power and Data locations to be within a recessed box and above TV Mount and behind TV. Consult with District IT on location.
- Tilted Mounts shall be installed as to allow easy access to TV Inputs and Controls.
- TV’s and Mounts to be purchased by District IT and installed by A/V contractors.

Visual Layout of Smart Classroom





Audiovisual Systems – Smart Classroom

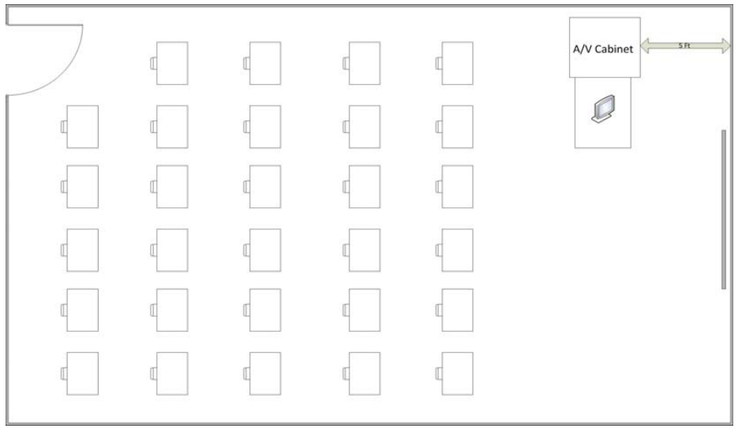
Smart Classrooms shall utilize a ceiling mounted projector and projection screen or LED TV, A/V Cabinet and ceiling mounted speakers.

An ADA compliant teaching table shall be located next to the A/V cabinet. Monitor and document camera shall be installed on the table.

System inputs shall be via input panel in the A/V Cabinet that will include HDMI, Audio and data ports.

Classroom content will be managed and controlled via the Districts A/V control system. Displays, Inputs and speakers shall integrate with A/V control system to support automatic switching of inputs and control of audio volume.

Typical Smart Classroom Layout



Audiovisual Systems – Computer Labs

Computer Labs shall utilize a ceiling mounted projector and projection screen or LED TV, A/V Cabinet and wall/ceiling mounted speakers.

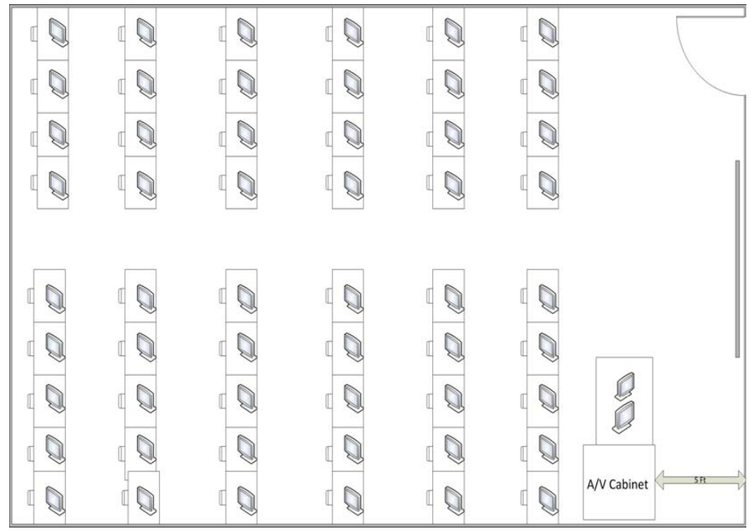
An ADA compliant teaching table shall be located next to the A/V cabinet. Monitor and document camera shall be installed on the table.

A/V cabinet to be configured with (2) teacher station monitors.

System inputs shall be via input panel in the A/V Cabinet that will include HDMI, Audio and data ports.

Classroom content will be managed and controlled via the Districts A/V control system. Displays, Inputs and speakers shall integrate with A/V control system to support automatic switching of inputs and control of audio volume.

Typical Computer Lab Layout



Audiovisual Systems – Conference Rooms

Conference Rooms shall utilize single wall mounted LED flat panel display sized accordingly for video content presentation. Size of flat panel display shall be determined by using the minimum display dimension formulas illustrated in Figure 1.

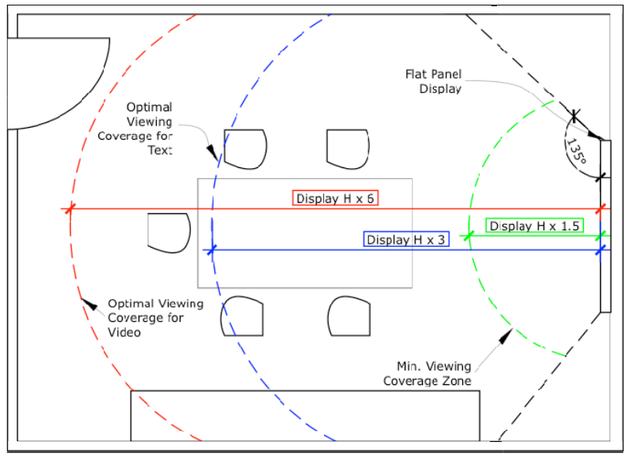


Figure 1: *Minimum display dimensions shall be calculated using the coverage area formulas represented above. Acceptable coverage area begins at the green dashed circle, which is calculated by obtaining the height of the display and multiplying it by 1.5. Alternatively, one could obtain the desired minimum coverage area and divide this by 1.5. Similarly, the blue and red dashed circles represent the optimal coverage areas for text and video images, respectively.*

Power requirements:

- (1) Single gang dual power outlet, within recessed box, to be installed above TV mount/behind the LED display.

Data requirements:

- (1) 2-port wall jack, within recessed box, behind LED display.
- (1) 2-Port data jack to be installed within the cable cubby or input panel on display wall.
  - Data cables to be run to IDF/MDF within the building
  - Data ports should be labeled as per the District labeling standard detailed in the SCC Telecom Standards Guideline.

Audio/Video requirements:

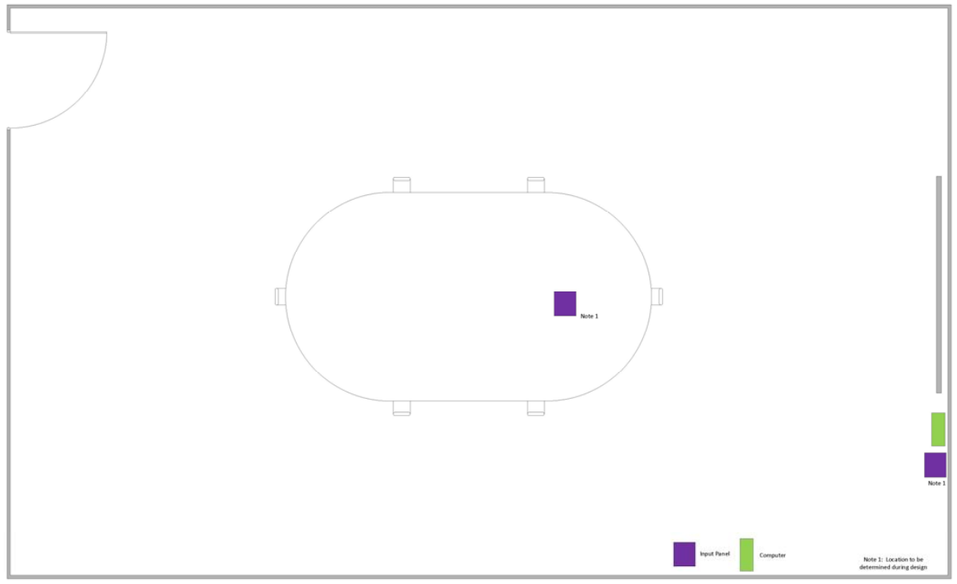
- (2) HDMI Cables run from Input Panels (either Cable cubby or Display Wall) to TV-HDMI inputs.
- Ceiling mounted speakers may be installed to provide the best sound throughout the conference room.
  - Coordinate with District IT to determine if speakers are needed.
- Tilted Mount shall be installed to provide easy access to display inputs and controls wherever possible

Lighting shall be coordinated for appropriate levels related to room functions.

Industry standards and guidelines shall be followed.

Refer to Codes & Standards section of this document for a list of related standards.

Typical Conference Room Layout



Note: *Larger conference rooms may require the addition of multiple cable cubbies to provide Data and Power outlets only. Coordinate number and location of additional cubbies with SCC IT.*

Digital Signage Systems

Digital signage content shall be displayed via LED flat panel displays sized accordingly for this application. Size of flat panel display shall be determined by using the minimum display dimension formulas illustrated in Figure 1. Digital signage is found typically in Lounges and public spaces, but may be required in specialty areas as well.

Power requirements:

- (1) Single gang dual power outlet, within recessed box, installed above TV mount/behind the LED display.

Data requirements:

- (1) 2-port wall jack, within recessed box, installed above TV mount/behind LED display.
  - Data cables to be run to IDF/MDF within the building
  - Data ports should be labeled as per the District labeling standard detailed in the SCC Telecom Standards Guideline.

Audio/Video requirements:

- Tilted Mount shall be installed to provide easy access to display inputs and controls wherever possible
- TV should be mounted on wall so as to permit optimal viewing and is to be secured to the mount to prevent easy theft.
- If deployed in outdoor or unmonitored public areas consideration should be given to anti-vandalism measures including cabinets with toughened Macaralon type screen protection.
- Content will be managed and controlled by the districts content management system

Coordinate all power/data and installation requirements with SCC IT prior to installing.

Refer to Codes & Standards section of this document for a list of related standards.

Preferred Manufacturers:

LED Flat Panel Displays:

1. Samsung
2. Sharp
3. NEC
4. Other as approved by IT

Video Projectors:

1. Panasonic
2. Hitachi
3. Epson
4. Other as approved by IT

Equipment purchases will be by District IT department. Certain circumstances may dictate vendor purchase (specialty/Nonstandard classroom equipment)

If contractor purchased, a complete Equipment lists/Bill of Materials ***must*** be approved by SCC Technology Services Management prior to purchase.

Purchases must follow the Technology Purchases policy of Solano Community College.

Substitutes Allowed:

All substitutions must be approved by SCC IT Management. Requests for substitutions must be submitted in writing prior to design, purchase, and installation.

Associated Design Standards and Construction Specifications

Codes and Standards:

ANSI/INFOCOMM 1M-2009 Audio Coverage Uniformity in Enclosed Listener Areas
ANSI/INFOCOMM 2M-2010 Standard Guide for Audiovisual Systems Design and Coordination Processes
ANSI/INFOCOMM 3M-2011 Projected Image System Contrast Ratio

Construction Specifications:

274100 Audiovisual Systems
274200 Digital Signage Systems

DESIGN STANDARD FOR CLOCKS

Purpose:

The purpose of this design standard is to standardize the clocks and clock systems used through-out the District's facilities, ensuring synchronized time, reliability, and consistent maintenance requirements and aesthetic qualities through-out the District.

Design Standard:

- Provide and install in each classroom, lab or teaching space. Install as needed in other offices or spaces in District facilities.
- Clocks to be battery model with remote antenna, wireless, draw time from GPS satellite, automatically adjust for Daylight Savings Time.
- Clocks to be 12.5” diameter, easy to read white clock face, with durable black frame and clear lens.
- Transmitters to be 1-watt, 5-watt, or 30-watt with internal or external antenna as needed; utilize 72MHz frequency: preferably installed indoors.

Approved Manufacturers:

Primex; clock model 14244.

Substitutions Allowed:

None.

Associated Design Standards and Construction Specifications:

Install per manufacturer’s specifications. .

DESIGN STANDARD FOR ASSISTIVE LISTENING SYSTEM

Purpose:

The purpose of this Standard is to ensure consistency in the provision of assistive listening devices through-out the District for convenience of users, and service/maintenance by the District.

Design Standard:

The assisted listening system shall be a Frequency Modulated Radio Transmission system assigned by the FCC exclusively for low power assistive listening systems. The system shall consist of rack-mounted transmitter, portable receivers, antenna and earphones. All equipment shall be standard catalogued products of a single manufacturer. System and components shall comply with CBC code requirements for same.

Stationary Transmitter

- Stationary FM transmitter capable of broadcasting on 57 channels
- SNR of 80 dB or greater
- Output power adjustable to quarter, half, or full
- Channel tuning capable of being locked
- Capable of broadcasting o both wide and narrow band channels
- Audio frequency responses of 50 Hz to 15k Hz, ± 3 dB at 72 MHz; or of 50 Hz to 10k Hz, ± dB at 72 MHz
- Two mixing audio inputs. Audio processor that is capable of automatic gain control and limiting.
- Listen Technologies model LT-800-072-01; or Williams Sound model T45
- Rack mount kit: Listen Technologies model LA-326; or Williams Sound model RPK 005

Portable Receivers

- Capable of receiving on 57 wide band channels with a SNR of 80dB or greater
- Capable of being locked on a single channel
- Capable of seeking channels
- Adjustable squelch
- Audio frequency response of 50 Hz to 15 KHz, ± 3 dB
- Stereo headset jack that allows user to plug in either a mono or stereo headset
- LCD display that indicates channel, battery level, low battery, battery charging, and RF signal strength
- Function in both DX and Local mode
- Operate off of 2 AA batteries. Include automatic battery charging circuitry for recharging of NiMH batteries.
- Listen Technologies model LR-400-072; or Williams Sound model R38

Receiver Accessories

- Charging carrying case for up to 8 units: Listen Technologies model LA-324; or Williams Sound model CHG 3512 PRO
- Ear speakers (per receiver): Listen Technologies model LA-164; or Williams Sound model EAR 022
- Neck loop that wirelessly connects to hearing aids equipped with a “T” coil: Listen Technologies LA-166; or Williams Sound model NKL 001
- NiMH rechargeable batteries: Listen Technologies model LA-362; or Williams Sound model BAT 026-2

Remote Antenna

- Able to transmit signals at 72 Mhz
- Mounted to a BNC wall plate: Listen Technologies LA-123; or Williams Sound model ANT 028
- RG58 coax cables with BNC connectors, length as required

Wall Plaque

- Sign(s) indicating equipment available for the hearing impaired per ADA requirements. May be provided by signage Vendor or equipment Vendor.
- Listen Technologies LA-304 ADA Access Compliance signage kit; or Williams Sounds IDP 008

Approved Manufacturers:

Listen Technologies
Williams Sound

Substitutes Allowed:

No substitutions allowed. (Reviewers, confirm this is College DSTM standard).

Associated Design Standards and Construction Specifications:

End of Document

Electronic Safety & Security Standards

DESIGN STANDARD FOR ELECTRONIC SAFETY AND SECURITY

Purpose

The purpose of this document is to standardize the basic elements of the Electronic Safety and Security systems design process. The Design Standard has the purpose of creating a consistent application of Electronic Safety and Security systems design throughout the Solano Community College (SCC) District, therefore achieving a standard of quality for maintenance and reliability throughout all renovation and new building projects. Deviations from this standard shall be approved by SCC.

Abbreviations

- **SSA** – Security Sensitive Areas
- **P&P's** – Policies & Procedures
- **LED** – Light Emitting Diode (type of lighting with preferable heat generation and energy consumption characteristics over traditional incandescent luminaires)
- **PV** – Photovoltaic (solar panels)
- **EMNS** – Emergency Mass Notification Systems
- **PA** – Public Address (overhead speakers)
- **AV** – Audiovisual
- **LAN** – Local Area Network (IP network based Ethernet data network)
- **IDS** – Intrusion Detection System (burglar alarm)
- **PIN code** – Personal Identification Number (numerical code entered on arming station keypad to arm or disarm an Intrusion Detection System)
- **ARM** – arming station keypad used to arm or disarm an Intrusion Detection System
- **MD** – Motion Detector (intrusion detection sensor)
- **EACS** – Electronic Access Control System
- **ACP** – Access Control Panel
- **CCTV** – Closed Circuit Television (older, traditional term for analog video surveillance system)
- **VMS** – Video Management System (newer term for IP network based video surveillance system)
- **NVR** – Network Video Recorder
- **PTZ** – Pan Tilt Zoom video surveillance camera (remotely operable in lieu of fixed)

Design Standard—Security Systems Ownership

An effective security program requires comprehensive administrative and operational planning, direction, oversight, and control. With regard to security electronics systems – including electronic access control, video surveillance, intrusion detection, and emergency communications – the "ownership" of the security systems by various associated parties must be clarified, codified in policy, assigned, and accepted.

There are 4 primary parties that must be assigned and must accept responsibility and accountability for various functions of service and maintenance as well as daily operation of the security systems. Importantly, such accountability cannot be reasonably and successfully assigned unless the associated party is also granted the authority, staffing, and funding to carry out the responsibility.

SCC Executive Leadership

1. Provides the authority, authorization, oversight, and funding for systems deployment and use, unless otherwise specified in the Standards.
2. Issues Policies & Procedures.
3. Determines the appropriate end-users of the system from both law enforcement professional security personnel and departmental staff personnel.
4. Coordinates the functional and operational system requirements between Academic and departmental representatives.

SCC IT

1. Provides network connectivity and support.
2. May provide computing hardware such as servers and computer workstations for use by the Security Systems Contractor/Integrator.
3. Ensures appropriate network security, firewalls, and encryption issues are addressed and documented.
4. Maintains scheduled maintenance of security systems software versions, licenses, and firmware (when such activities are not outsourced to the Security Systems Contractor/Integrator).
5. Maintains scheduled maintenance of security systems hardware operating system, antivirus software, utilities, and system activity logs.
6. Coordinates authorized login UserID and passwords with the network domain identity structure.

Security Systems Contractor/Integrator

1. Provides, installs, programs, configures, and tests the security systems hardware and software.
2. Warrants the installation for one year from date of project substantial completion.
3. May be engaged under contract to provide extended warranty including work order service and preventative maintenance beyond the one year project warranty.
4. This role may be filled by one or more contractors.

SCC Engineering & Plant Ops

1. Provides, installs, programs, configures, and tests the security systems hardware and software as needed above and beyond the scope of the Security Systems Contractor/Integrator and when the Security Systems Contractor/Integrator is no longer under contract.
2. Provides, installs, and maintains door/frame assemblies and electrified locking door hardware.
3. Maintains traditional physical keying system with documented issuance and retrieval audit logs.
4. Provides the lead role in coordinating the efforts of the Security Systems Contractor/Integrator with SCC Executive Leadership, IT, project design team, and the work of other trades and contractors.

Design Standard – Electronic Access Control System (EACS) and Door Lock-Down

Design Standards ensure that Electronic Access Control System and Door Lock-Down installations, retrofits, replacements, and upgrades maintain system consistency and compatibility – regardless of project timing or funding source. These Standards also support a single system database to avoid redundancy, duplication, and error, facilitate system administrator training and back-up, facilitate service and maintenance, and act as a record document that can be periodically updated to reflect new developments and requirements.

The District has established Stanley WI-Q/Omni Wireless Access Control System as the District Standard for door access and lock-down, and utilizes it at all District campuses and facilities.

- Include electronic door control in the door hardware specification and procure under the door hardware trade. If separate control system sub-contractor, they should be under door hardware vendor/contractor.
  - Installers must be certified in the WI-Q/Omni System
- Provide an Omni wireless access controller installed to control a specific proximity device that will lock down all electronic locks in the building. Provide two of these proximity devices in each building. Locate the proximity devices:
  - One at each end of the building
  - In corridor where easily accessible
  - Within 10’ – 20’ from the exterior door, but not at the exterior door
- Provide electronically controlled door locks at the following locations:
  - Exterior doors, except emergency exit-only doors with no exterior trim
  - Doors to Smart Classrooms
  - Doors to computer labs
  - Doors to any rooms with wall mounted flat screens
  - Doors to conference rooms
  - Doors to suites of offices
  - Doors to MDF and IDF rooms
  - Doors to Lost & Found or other asset storage areas
  - Doors to common areas where people might congregate such as mail rooms and copy areas
  - Security sensitive areas, as may be approved by the Superintendent President
- Door locks to operate with key, keypad, and proximity device.
- Interior door locks to be Best Dorma Kaba.
- Exterior doors will be on the Omni programmable access system wireless access controller. Provide Precision MLR panic hardware with Best mortised IC lock.
- Portal Gateways:
  - Design should establish redundancy in signal strength
  - Each floor of a building to have its own signal system
  - Prior to installation, provide a survey by Dorma Kaba to confirm locations of portal gateways
  - Following installation, perform another test to verify signal strength to each device complies with design and is adequate
  - Each portal gateway to include two ceiling mount antennas
  - Install two spare drops of Cat6 cable with thirty feet coil above ceiling at each floor for potential future need
- Graphics to emulate format and characteristics of that of the rest of the buildings on campus, and utilize the same terminology.
- Attic Stock: provide two spares of the following:
  - WACs
  - Gateway portals
  - Door locks.

The following doors have access control considerations other than the electronic access control with electrified door hardware:

- Emergency exit only doors shall have no exterior trim (no exterior lockset knobs/lever handles or key cylinders) unless required by SCC or DSA. These doors shall be used for exiting only and should not be used as entry doors into the building.
    - These exit-only doors may be locally alarmed with door prop alarms to indicate that the door has been left open. These locations shall be determined on a project-specific case by case basis.
    - Where door prop alarms are used, hardwire for low-voltage power and support by appropriate signage.

Design Standard—Video Management System (VMS)

System Criteria

1. SCC will deploy a single standardized, centralized, and compatible video surveillance system at all campuses

2. System will consist of cameras, cabling, Power-Over-Ethernet (PoE) data network switches, and Video Management System video recorder/software.

3. System shall be IP network (Ethernet) based; no analog cameras or other system components shall be specified, provided, or installed.

4. Cameras shall primarily be homerun hardwired with cabling. Cabling shall be completed by the data cabling vendor for the project and follow Design Standard, Division 27 00 00 (Design Standard for Telecommunications), using a single CAT6 cable for each camera.

5. The Video Management System that records the camera images is used for system management, command and control, and incident investigation purposes. The District Standard for Video Management System in Genetec. All cameras and system components shall be fully compatible with the Genetec software.

6. All models of cameras shall be Axis, each camera type to be appropriate for the specific location and functionality needed (indoor/outdoor, fixed view, PTZ, etc.) and vandal resistant.

7. Security camera locations and type must be approved by SCC Campus Security, Facilities and IT departments. Camera Locations:
    - Entries and exits of buildings
    - Corridors in buildings
    - Not in the classrooms
    - Parking lots
    - Entry/exit driveways to parking lots (license plate views)
    - Other locations may be recommended or requested if approved by SCC.

8. Cameras are to be procured, installed, and software configured by SCC IT and/or IT's security camera contractor, unless otherwise specified in project contract documents.

9. SCC will purchase all security camera software and licenses.

10. Storage shall have capacity to store the video images for 30 days. Servers and storage will be purchased and installed by SCC IT department.

Camera Application Criteria

Video surveillance cameras shall be designed, provided, and installed at the following areas in the following order of priority; camera placements shall be coordinated with projects that are pending in the SCC Master Plan so that projects are not installing cameras that will subsequently be removed:

1. Primary campus vehicular entry/exit lanes; though these cameras are not intended to be software-based “License Plate Recognition (LPR)” cameras they should be mounted low with IR illuminators in order to provide views of vehicles and license plates. These installations typically leverage an available local power source such as a light-pole and may utilize underground conduit runs or wireless point-to-point to send the video signal to a building where the recording equipment is installed.

2. Parking lots general views as confirmed in design projects by SCC; coordinated with obstructions, trees/landscaping, and PV panels; may include bus stop and drop-off/pick-up curbs

3. Building primary pedestrian entry/exit doors associated with electronic access controlled doors

4. Building secondary pedestrian entry/exit and emergency exit only doors

5. Building second floors points of vertical transportation and corridors

6. Quad (clock tower)

7. Cafeteria

8. Building Security Sensitive Areas (SSA) doors such as IDF's, computer labs, and asset/equipment storage closets associated with electronic access controlled doors, specifically including but not limited to any associated money handling areas

9. Specific areas where past incidents have occurred and/or future incidents are anticipated to occur, specifically including but not limited to Financial Aid, Check Cashing, Veterans, and Counseling

10. Child care center

Design Standard—Intrusion Detection System (IDS)

System Criteria

1. SCC will deploy industry standard intrusion alarm panels at designated campuses buildings or designated high-value rooms within buildings for the detection and monitoring of unauthorized entry

2. Intrusion alarm panels do not have to be of a single consistent type, this equipment is essentially a commodity and the functionality between various products is similar. However, from the point of view of contractor support and SCC service and maintenance the College should consider standardizing on a single product type

3. Intrusion detection system alarm control panels shall be installed in a locked enclosure with a locked room

4. PIN-code arming/disarming keypad station shall be installed just inside the main authorized user entry door

    a. The keypad station should not be visible from the exterior of the building or room to be protected

    b. The main authorized user entry door associated with the keypad station shall be programmed as an entry/exit delay in the system in order to give the authorized user time to enter and disarm, or exit after arming, the system

    c. Do not install a motion detection sensor that covers the area of the keypad station, or the authorized user will not be able to enter and disarm the system without activating the alarm, and they will not be able to arm the system without generating a system fault

5. Primary alarm signal communication shall be via a telephone line dialer module

    a. SCC shall contract monitoring service for each alarm panel from a UL-Listed 3rd party commercial Central Station monitoring service

    b. Alarm signal communication telephone line shall be a supervised circuit to produce a 'trouble' or 'comm loss' alarm signal on disruption or loss of the alarm signal communication telephone line

    c. Each alarm panel shall require a dedicated analog telephone line (outside service line, not an analog line out from a digital PBX)

6. Each authorized user shall have their own unique PIN-code for arming and disarming of the system

    a. PIN-codes shall be maintained in a centrally controlled list and changed periodically (minimum annually)

    b. PIN-codes shall be removed from the system on turnover of a previously authorized user; this step should be included in the termination or exit interview HR processes along with retrieving any traditional door lock keys and access control card badge credentials

    c. Alarm panels may be programmed to arm and disarm on schedule in addition to a manual process

Intrusion Detection System Application Criteria

Intrusion Detection System equipment, cabling, and sensor devices shall be designed, provided, and installed on the following doors, windows, and rooms for an entire building or a specific interior area to be monitored:

1. Exterior doors leading into the building or area: door position switch alarm contacts

    a. Mounted concealed in the door and frame header rabbet

    b. On certain existing doors surface-mounted door position switch alarm contacts may need to be installed on the interior door and frame header face; installation shall limit the amount of exposed cabling and wiring by using armored flex conduit to a junction box

2. Exterior windows leading into the building or area: glass break detection sensors

    a. Ceiling mounted or wall-mounted

3. Interior rooms and corridors: motion detection sensors

    a. Ceiling mounted or wall-mounted

    b. Motion detection sensors shall be dual-technology type to minimize false alarms: passive infrared (PIR) and microwave (Doppler effect)

Design Standard—Emergency Mass Notification Systems

Emergency Mass Notification shall be provided, installed, and utilized on SCC campuses in accordance with the communication goals of the President's Advisory Council on Emergency Preparedness (PACEP).

The District utilized an electronic automated notification message broadcasting service over SMS text/ email/phone call trees. Secondary announcements may be made over indoor public address or outdoor public address systems if they exist, but adding these types of systems to buildings is not a District Standard.

Automated Notification Message Broadcasting Service

Refer to AlertU website https://www.alertu.org/ for more information regarding this hosted service.

Refer to SCC website http://www.solano.edu/ for enrollment information.

Outdoor "Blue Tower" Emergency Telephones

Outdoor 2-way emergency communication is produced through exterior mounted "Blue Tower" Emergency Telephones. These Emergency Telephones should be installed throughout the campus grounds based on a campus-wide strategic layout though they may be installed as part of specific projects.

Outdoor "Blue Tower" Emergency Telephones shall be: Talk-A-Phone WEBS multi-layer hardware and software mass notification platform. Platform components include: outdoor tower units or wall-mount units. The tower hardware units can be configured to support strobes, cameras, and light fixtures. Tower hardware units shall be provided with supervised communication links and call source announcement capability. The outdoor public address loudspeakers shall be integrated into the Talk-A-Phone WEBS mass notification platform.

Design Standard— Crime Prevention through Environmental Design (CPTED)

Crime Prevention through Environmental Design (CPTED) is a design perspective which leverages physical and environmental aspects to incorporate security within a campus.

The four principles of CPTED are:

- Natural Surveillance
- Natural Access Control
- Territorial Reinforcement
- Maintenance and Management

From a high-level perspective, Natural Surveillance would be ensuring that sight lines are open and trees and bushes aren't obstructing views in strategic areas that could encourage crime or vandalism. The intent of natural surveillance is to increase the perception of observation, which can affect and alter the decision-making process with regard to inappropriate and unauthorized behavior.

Natural Access Control would be the thoughtful application of environmental designs (plants, trees, or benches) used to "control" or "funnel" access to certain areas. For example, properly located entrances, exits, fencing, landscaping and lighting can subtly direct both foot and vehicular traffic in ways that decreases criminal opportunities.

The last two principals – Territorial Reinforcement and Maintenance and Management – are related to invoking a sense of pride and investment within the campus so people feel this campus is their own, which naturally encourages them to protect the space. This is known to be related to reduction in opportunities for aberrant or criminal behavior such as vandalism.

Approved Manufacturers

Stanley Security Solutions / BEST Access Systems (EACS)

Genetec Video Management System (VMS)

DSC MaxSys (IDS)

Talk-A-Phone WEBS (EMNS)

Substitutes Allowed

No substitutions allowed.

Associated Design Standards and Construction Specifications

Associated Design Standards:

None noted.

Construction Specifications:

- 28 10 00 Electronic Access Control and Intrusion Detection
- 28 13 00 Access Control
- 28 16 00 Intrusion Detection
- 28 20 00 Electronic Surveillance
- 28 23 00 Video Surveillance

Fire Alarm Standards

DESIGN STANDARD FOR FIRE ALARM SYSTEMS

Purpose

The purpose of this document is to standardize the basic elements of the Fire Alarm system design process. The Design Standard has the purpose of creating a consistent application of Fire Alarm system design throughout the Solano Community College (SCC) District, therefore achieving a standard of quality for maintenance and reliability throughout all renovation and new building projects. Deviations from this standard shall be approved by SCC.

Design Standard— Fire Alarm Systems (FAS)

Design standards ensure that the Fire Alarm System installations, retrofits, replacements, and upgrades maintain system consistency and compatibility – regardless of project timing or funding source. These EACS Standards require use of a specific brand (manufacturer) of the FAS, including control panels, alarm initiating devices, and alarm notification devices, to ensure uniformity in alarm reporting, and compatibility with the existing FAS in use on the SCCD campus. The standards will also facilitate service and maintenance, and act as a record document that can be periodically updated to reflect new developments and requirements.

Fire Alarm System Criteria

1. SCCD will continue to utilize a standardized Fire Alarm System at all campus locations, compatible with the existing Fire Alarm systems.
2. For new construction, the contractor shall provide a new Fire Alarm Control Panel (FACP), GE model EST3. The FACP shall be connected to the campus-wide Fire Alarm system network via fiber optic cable using a multi-priority peer-to-peer token ring protocol.
3. The FACP will be programmed to display system status and all alarms at the FACP, and on the existing Fireworks graphics workstations using the EST3 Life Safety Network.
4. All alarms and trouble conditions will also report to the UL-approved 24 hour central station service (Sacramento Valley Alarm) via the existing Digital Alarm Communicator Transmitter (DACT) located inside the Building 1800B FACP.
5. For retrofit/remodel projects, the contractor shall utilize the existing GE EST3 FACP found in each of the existing buildings. All alarm initiating devices and alarm notification devices shall be connected to the FACP in the affected building.
6. For buildings not located on the main SCCD campus, the FACP shall include a DACT connected via phone line to the UL-approved 24 hour central station monitoring service.
7. Consideration should be given to potential future integration of the FAS with the Emergency Mass Notification System (EMNS) when an EMNS is designed and put into place on the SCCD campus.

Fire Alarm System Design Criteria

1. All Fire Alarm System (FAS) alarm initiation devices shall be intelligent addressable type, and shall display specific device ID, type, and location on the FACP, and on the FireWorks graphic workstation annunciator.
2. All alarms and trouble conditions will report to the UL-approved 24 hour central station service (Sacramento Valley Alarm) via the existing system dialer located in Building 1800B.
3. The FAS design shall include intelligent manual pull stations at all building exits.
4. The FAS design shall include intelligent photoelectric smoke detectors at all Code required locations.
5. The FAS design shall include intelligent heat detectors at all Code required locations.
6. The FAS design shall include intelligent photoelectric duct-mounted smoke detectors for all supply fans > 2,000 CFM. Provide NEMA-3R enclosures for all duct smoke detectors mounted in exterior and/or exposed locations. Provide fan shutdown upon alarm of the associated duct smoke detector.
7. The FAS shall monitor fire protection (sprinkler) system water flow alarm and valve tamper switches.
8. The FAS shall monitor all auxiliary alarm systems (fire suppression, etc.) as required by Code.
9. The FAS shall provide audible and visual alarm notification throughout the affected building in the event of an alarm. All strobe alarm lights shall be synchronized, and installed in compliance with ADA regulations.
10. All alarms and trouble conditions will report to the UL-approved 24 hour central station service (Sacramento Valley Alarm) via the existing system dialer located in Building 1800B.
11. The Fire Alarm contractor shall be responsible for all required permits.
12. The Fire Alarm contractor shall provide complete system documentation, including product data, associated CSFM listing sheets, and installation shop drawings, and shall submit documentation and obtain approval from the Division of the State Architect prior to the start of construction.

13. The Fire Alarm contractor shall conduct a test and commissioning of the installed system, and shall obtain approval from the Authority Having Jurisdiction (AHJ) prior to building occupancy.

14. The Fire Alarm Contractor and manufacturer guarantee installation, equipment, software, software support and all parts and labor for one year from written notification of acceptance by the Owner.

15. The Fire Alarm contractor shall provide record drawings showing the as-built condition/location of all equipment, devices, and wiring installed on the project.

Approved Manufacturers

GE EST3 Fire Alarm Control Panel

Edwards Intelligent Addressable Alarm Devices

Edwards Alarm Notification Devices

System Sensor Alarm Notification devices

Substitutes Allowed

No substitutions allowed.

Associated Code References and Construction Specifications

Associated Code References (current approved issue):

- ADA – Title 3 of the Americans with Disabilities Act
- CCR – Titles 19 and 24 of the California Code of Regulations
- CBC – 2012 International Building Code with 2013 CA Amendments
- CEC – 2011 National Electrical Code with 2013 CA Amendments
- CFC – 2012 International Fire Code with 2013 CA Amendments
- CMC – 2012 International Mechanical Code with 2013 CA Amendments
- NEMA – National Electrical Manufacturers' Association
- NFPA 72 – 2010 National Fire Protection Association Standards
- UL – Underwriters Laboratories, Inc.

Construction Specifications:

- 28 31 00 Fire Alarm Systems

SECTION 26 11 16.11

SECONDARY UNIT SUBSTATIONS – SECONDARY LESS THAN 1000 V

PART 1 GENERAL

1.01 SCOPE

A. The Contractor shall furnish and install the secondary unit substation(s) complete from the incoming line terminals to the outgoing line terminals as specified herein and as shown on the contract drawings.

B. The secondary unit substation shall consist of primary equipment, transformer and secondary equipment as specified below. The manufacturer of the unit substation shall furnish and coordinate all major components of the substations, including incoming primary equipment section, transformer and low-voltage section, as well as circuit breakers, fusible switches, and metering components. Provide a single warranty covering all substation assemblies, transformers and components.

C. Connections between the primary device and transformer shall be bus, and between the transformer and secondary shall be flexible bus braid.

D. Outdoor primary and secondary equipment where specified shall be of weatherproof construction, rodent proof and shall contain 120-volt space heaters, receptacles and lighting as required.

1.02 RELATED SECTIONS

A. Section 26 12 13 – Liquid Filled, Medium Voltage Unit Substation Transformers

B. Section 26 13 16.13 – Medium Voltage Load Interrupter Switchgear

C. Section 26 24 13.11 – Switchboards – Low Voltage

1.03 REFERENCES

A. The secondary unit substation shall be designed, assembled, tested and installed in accordance with latest applicable standards of NEMA, IEEE and ANSI, applicable to its three major sections:

1. MV Metal-Clad Switchgear – NEMA SG4, SG5; ANSI C37
2. MV Metal-Enclosed Switchgear – NEMA SG4, SG5; ANSI C37
3. MV Load Interrupter Switchgear – NEMA SG4, SG5; ANSI C37
4. MV Motor Controllers – ANSI/NEMA ICS-3-Part 2, UL347
5. Secondary Substation Transformers – NEMA 210, IEEE 100, ANSI C57
6. LV Metal-Enclosed Switchgear – ANSI C37, UL 1558
7. LV Distribution Switchboards – NEMA PB-2, UL 891

1.04 SUBMITTALS – FOR REVIEW/APPROVAL

A. The following information shall be submitted to the Engineer:

1. Master drawing index
2. Front view elevation
3. Floor plan

4. Single line
5. Schematic diagram
6. Nameplate schedule
7. Component list
8. Conduit entry/exit locations
9. Assembly ratings including:
    a. Short-circuit rating
    b. Voltage
    c. Continuous current
    d. Basic Impulse level for equipment over 600 volts
    e. kVA
10. Major component ratings including:
    a. Voltage
    b. Continuous current
    c. Interrupting ratings
11. Cable terminal sizes
12. Connection details between close-coupled assemblies
13. Composite front view and floor plan of close-coupled assemblies
14. Impedance for transformers
15. Product data sheets

B. Where applicable, the following additional information shall be submitted to the Engineer:
    1. Busway connection
    2. Key interlock scheme drawing and sequence of operation

1.05 SUBMITTALS – FOR CONSTRUCTION

A. The following information shall be submitted for record purposes:
    1. Final as-built drawings and information for items listed Paragraph 1.04, and shall incorporate all changes made during the manufacturing process
    2. Wiring diagrams
    3. Certified production test reports
    4. Installation information
    5. Seismic certification as specified

1.06 QUALIFICATIONS

A. The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.

B. For the equipment specified herein, the manufacturer shall be ISO 9001 or 9002 certified.

C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

D. Provide Seismic tested equipment as follows:

1. The equipment and major components shall be suitable for and certified by actual seismic testing to meet all applicable seismic requirements of latest California Building Code (CBC).

2. The Project Structural Engineer shall provide site specific ground motion criteria for use by the manufacturer to establish SDS values required.

3. The IP rating of the equipment shall be 1.5

4. The Structural Engineer for the Site will evaluate the SDS values published on the Manufacturer's website to ascertain that they are "equal to" or "greater than" those required for the Project Site.

5. The following minimum mounting and installation guidelines shall be met, unless specifically modified by the above referenced standards.

a. The Contractor shall provide equipment anchorage details, coordinated with the equipment mounting provision, prepared and stamped by a licensed structural engineer in the state. Mounting recommendations shall be provided by the manufacturer based upon the above criteria to verify the seismic design of the equipment.

b. The equipment manufacturer shall certify that the equipment can withstand, that is, function following the seismic event, including both vertical and lateral required response spectra as specified in above codes.

c. The equipment manufacturer shall document the requirements necessary for proper seismic mounting of the equipment. Seismic qualification shall be considered achieved when the capability of the equipment, meets or exceeds the specified response spectra.

1.07 REGULATORY REQUIREMENTS

A. Certified copies of production test reports shall be supplied demonstrating compliance with these standards when requested by the engineer.

1.08 DELIVERY, STORAGE AND HANDLING

A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.09 OPERATION AND MAINTENANCE MANUALS

A. Equipment operation and maintenance manuals shall be provided with each assembly shipped and shall include instruction leaflets, instruction bulletins, and renewal parts lists where applicable for the complete assembly and each major component.

PART 2 A PRODUCTS

2.01 SECTION 26 12 13 – LIQUID FILLED, MEDIUM VOLTAGE UNIT SUBSTATION TRANSFORMERS

2.02 SECTION 26 13 16.13 – MEDIUM VOLTAGE LOAD INTERRUPTER SWITCHGEAR

2.03 SECTION 26 24 13.11 – SWITCHBOARDS – LOW VOLTAGE

PART 3 EXECUTION

3.01 FACTORY TESTING

A. Standard factory tests shall be performed on the primary equipment provided under this section. All tests shall be in accordance with the latest version of ANSI and NEMA standards.

B. The following factory tests shall be made on all transformers. All tests shall be in accordance with the latest revision of ANSI and NEMA standards.

1. Resistance measurements of all windings on the rated voltage connection of each unit and at the tap extremes of one unit only of a given rating on this project

2. Ratio tests on the rated voltage connection and on all tap connections

3. Polarity and phase-relation tests on the rated voltage connections

4. No-load loss at rated voltage on the rated voltage connection

5. Exciting current at rated voltage on the rated voltage connection

6. Impedance and load loss at rated current on the rated voltage connection of each unit and on the tap extremes of one unit only of a given rating on this project

7. Applied potential test

8. Induced potential tests

9. Temperature test(s) shall be made on all units. Tests shall not be required when there is available a record of a temperature test on an essentially duplicate unit. When a transformer is supplied with auxiliary cooling equipment to provide more than one kVA rating, temperature tests as listed above shall be made on the lowest kVA OA or AA rating and the highest kVA FA rating

10. ANSI impulse test on all primary windings

C. The following standard factory tests shall be performed on the secondary equipment provided under this section. All tests shall be in accordance with the latest version of ANSI and NEMA standards.

1. The switchgear shall be completely assembled, wired, adjusted and tested at the factory. After assembly, the complete switchgear shall be tested to ensure the accuracy of the wiring and the functioning of all equipment. The main bus system shall be given a dielectric test of 2200 volts for one minute between live parts and ground and between opposite polarities

2. The wiring and control circuits shall be given a dielectric test of 1500 volts for one minute or 1800 volts for one second between live parts and ground, in accordance with ANSI C37.20.1

D. The manufacturer shall provide three (3) certified copies of factory test reports.

E. Factory tests as outlined above shall be witnessed by the owner's representative.

1. The manufacturer shall notify the owner two (2) weeks prior to the date the tests are to be performed

2. The manufacturer shall include the cost of transportation and lodging for up to three (3) owner's representatives. The cost of meals and incidental expenses shall be the owner's responsibility

3.02 FIELD QUALITY CONTROL

A. Provide the services of a qualified factory-trained manufacturer's representative to assist the Contractor in installation and startup of the equipment specified under this section for a period of 2 working days. The manufacturer's representative shall provide technical direction and

assistance to the contractor in general assembly of the equipment, connections and adjustments, and testing of the assembly and components contained herein.

B. The Contractor shall provide three (3) copies of the manufacturer's field startup report.

3.03 MANUFACTURER'S CERTIFICATION

A. A qualified factory-trained manufacturer's representative shall certify in writing that the equipment has been installed, adjusted and tested in accordance with the manufacturer's recommendations.

B. The Contractor shall provide three (3) copies of the manufacturer's representative's certification.

3.04 TRAINING

A. The Contractor shall provide a training session for up to five (5) owner's representatives for 2 normal workdays at a job site location determined by the owner.

B. The training session shall be conducted by a manufacturer's qualified representative. The training program shall include instructions on the assembly including primary equipment, transformer, and secondary equipment. All circuit breakers, protective devices and other major components shall be included.

3.05 INSTALLATION

A. The contractor shall install all equipment per the manufacturer’s recommendation and the contract drawings.

B. All necessary hardware to secure the assembly in place shall be provided by the contractor.

3.06 FIELD ADJUSTMENTS

A. The Contractor shall perform field adjustments of the protective devices as required to place the equipment in final operating condition. The settings shall be in accordance with the approved short-circuit study, protective device evaluation study and protective device coordination study.

B. Necessary field settings of devices and adjustments and minor modifications to equipment to accomplish conformance with an approved short circuit and protective device coordination study shall be carried out by the Contractor at no additional cost to the owner.

3.07 FIELD TESTING

A. Contractor to hire 3rd party testing agency to perform ANSI/NETA tests.

SECTION 26 12 13.01
LIQUID-FILLED, MEDIUM-VOLTAGE UNIT SUBSTATION TRANSFORMERS

PART 1 GENERAL

1.01 SCOPE

A. This specification covers the electrical and mechanical characteristics of three-phase substation distribution transformers.

1.02 APPLICABLE STANDARDS

A. All characteristics, definitions, and terminology, except as specifically covered in this specification, shall be in accordance with the latest revision of the following IEEE®, Department of Energy, and NEMA® standards.

1. IEEE Std C57.12.00™-2015 – IEEE Standard for Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers
2. IEEE Std C57.12.28™-2014 – Sections 5.3, 5.4, 5.5 – Coating System Requirements
3. IEEE Std C57.12.36™- 2017 – IEEE Standard Requirements for Liquid-Immersed Distribution Substation Transformers
4. IEEE Std C57.12.70™-2011 – IEEE Standard for Terminal Markings and Connections for Distribution and Power Transformers
5. IEEE Std C57.12.90™-2010 – IEEE Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers and IEEE Guide for Short-Circuit Testing of Distribution and Power Transformers
6. IEEE Std C57.154™ -2012 – IEEE Standard for the Design, Testing, and Application of Liquid-Immersed Distribution, Power, and Regulating Transformers Using High-Temperature Insulation Systems and Operating at Elevated Temperatures
7. NEMA® TR 1-1993 (R2000) – Transformers, Regulators and Reactors, Table 0-2 Audible Sound Levels
8. 10 CFR Part 431 – Department of Energy–Energy Conservation Program: Energy Conservation Standards for Distribution Transformers; Final Rule
9. IEEE Std 386™-2006 – IEEE Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600 V

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Zetrak;

1. Contact: Roberto Rosario, Powersystems, Group, LLC (682-307-7380), robertr@pwrsystemsgroup.com , www.pwsystemsgroup.com

B. Or approved equal

2.02 RATINGS

A. The transformer shall be designed in accordance with this specification and the base kVA rating shall be: per contract drawings.

B. The transformer shall have a high voltage and the basic lightning impulse insulation level (BIL) of 15 kV and 95 kV BIL

C. The low voltage and the basic lightning impulse insulation level (BIL) shall be 480Y/277V and 30 kV BIL.

D. The high voltage and low voltage connections of the transformer shall be:

1. [] Delta - Wye:

   a. For Delta - Wye configurations the low voltage neutral shall be a fully insulated X0 bushing. The low voltage shall lag the high voltage by 30°.

2. [X] Delta - Grounded Wye

   a. For Delta - Grounded Wye configurations the low voltage neutral shall be a fully insulated X0 bushing with ground strap. The low voltage shall lag the high voltage by 30°.

3. [] Delta - Delta

   a. For Delta - Delta configurations the transformer shall be provided without a neutral bushing. There shall be no phase shift between the high voltage and low voltage.

4. [] Grounded Wye - Wye

   a. For Grounded Wye - Wye configurations the high voltage neutral shall be internally tied to the low voltage neutral and brought out as the H0X0 bushing. There shall be no phase shift between the high voltage and low voltage.

5. [] Wye - Grounded Wye

   a. For Wye - Grounded Wye configurations the high voltage neutral shall be brought out as the Ho bushing on the high voltage side and the low voltage neutral shall be brought out as the X0 bushing with ground strap on the low voltage side. There shall be no phase shift between the high voltage and low voltage.

6. [] Wye - Delta

   a. For Wye - Delta configurations the high voltage neutral shall be brought out as the Ho bushing on the high voltage side. The low voltage shall lag the high voltage by 30°.

E. The transformer shall be furnished with full capacity high-voltage taps. The tap-changer shall be clearly labeled to reflect that the transformer must be de-energized before operating the tap-changer as required in Section 4.3 of IEEE Std C57.12.34™-2009 standard. The tap-changer shall be operable on the higher voltage only for transformers with dual high voltages. The unit shall have one of the following tap configurations:

1. [] No Taps
2. [X] Two – 2 ½% taps above and below rated voltage (split taps)
3. [] Four – 2 ½% taps below rated voltage (four below)
4. [] NEMA taps (14400, 13800, 13200, 12470, 12540)
5. [] Non-standard tap configuration: _____

F. The dielectric coolant shall be listed less-flammable fluid meeting the requirements of National Electrical Code® Section 450-23 and the requirements of the National Electrical Safety Code®

(IEEE Std C2™-2002 standard), Section 15. The dielectric coolant shall be non-toxic*, non-bioaccumulating and be readily and completely biodegradable per EPA OPPTS 835.3100. The base fluid shall be 100% derived from edible seed oils and food grade performance enhancing additives. The fluid shall not require genetically altered seeds for its base oil. The fluid shall result in zero mortality when tested on trout fry *. The fluid shall be certified to comply with the US EPA Environmental Technology Verification (ETV) requirements and tested for compatibility with transformer components. The fluid shall be Factory Mutual Approved®, UL® Classified Dielectric Medium (UL-EOUV) and UL® Classified Transformer Fluid (UL-EOVK), Envirotemp™ FR3™ fluid.

*(Per OECD G.L. 203)

G. The transformer, filled with Envirotemp™ FR3™ fluid, shall have a:

1. [] 65°C average winding temperature rise rating. The above winding temperature rise shall not exceed 65°C when loaded at base kVA rating.

2. [] 75°C average winding temperature rise rating. The above winding temperature rise shall not exceed 75°C when loaded at base kVA rating. This transformer is identified as a PEAK transformer.

3. [x] 55/65°C average winding temperature rise rating. The above winding temperature rise shall not exceed 55°C when loaded at base kVA rating. The transformer shall provide an additional 12% continuous operating capacity at the 65°C rating.

4. [] 65/75°C average winding temperature rise rating. The above winding temperature rise shall not exceed 65°C when loaded at base kVA rating. The transformer shall provide an additional 12% continuous operating capacity at the 75°C rating. This transformer is identified as a PEAK transformer.

5. [] 55/75°C average winding temperature rise rating. The above winding temperature rise shall not exceed 55°C when loaded at base kVA rating. The transformer shall provide an additional 22% continuous operating capacity at the 75°C rating. This transformer is identified as a PEAK transformer.

H. The percent impedance voltage, as measured on the rated voltage connection, shall be per Table 5 of IEEE Std C57.12.36™-2007 standard.

I. The transformer shall be cooled by the natural circulation of air over the tank surface, with future kVA capacity built into the cooling surfaces and conductors. The unit shall be provided with KNAN/Future KNAF rated cooling. Additional capacity ratings shall be as follows; 15% for 750-2,000 kVA, 25% for 2,500-10,000 kVA, 33% for 12,000 kVA

J. UL® Listing/Classification and FM® Approval

1. [x] The transformer shall be UL® Listed (certifying compliance with IEEE® standards only) per UL® XPLH.

2. [] The transformer shall be combination UL® Listed & Classified to comply with NEC® 450-23 listing restrictions for installations on, near, or inside of buildings per UL® XPLH.

3. [] The transformer shall be FM® Global (FM) Approved to comply with NEC® 450-23 listing restrictions for installations on, near, or inside of buildings.

2.03 CONSTRUCTION

A. The core and coil shall be vacuum processed to ensure maximum penetration of insulating fluid into the coil insulation system. While under vacuum, the windings will be energized to heat the coils and drive out moisture, and the transformer will be filled with preheated filtered degassed insulating fluid. The core shall be manufactured from burr-free, grain-oriented silicon steel and

shall be precisely stacked to eliminate gaps in the corner joints. The coil shall be insulated with B-stage, epoxy coated, diamond pattern, insulating paper, which shall be thermally cured under pressure to ensure proper bonding of conductor and paper.

B. Panel type radiators or corrugate type cooling are welded directly to the tank when additional cooling is required.

C. The tank must be welded using precision cut, cold-rolled steel plate and equipped with extra-heavy duty, welded-in-place lifting lugs and jacking provisions. The tank base must be designed to allow skidding or rolling in any direction.

D. The transformer shall be of sealed tank construction of sufficient strength to withstand a pressure of 7 psig without permanent distortion, and 15 psig without rupturing.

E. The tank shall include a pressure relief device as a means to relieve pressure in excess of pressure resulting from normal operation. The venting and sealing characteristics shall be as follows:

1. Cracking Pressure: 10 psig +/-2 psig
2. Resealing Pressure: 6-psig minimum
3. Zero leakage from reseal pressure to -8 psig
4. Flow at 15 psig: 50 SCFM minimum

F. The tank shall be cleaned with an alkaline cleaning agent to remove grease and oil. An iron phosphate coating shall then be chemically bonded to the metal to assure coating adhesion and retard corrosion. The tank shall be primed with an electrodeposited powder epoxy to provide a barrier against moisture, salt, and corrosives. The top-coat shall be a liquid polyurethane coating to seal and add ultraviolet protection. The tank coating shall meet all requirements in IEEE Std C57.12.28™-2014 standard.

G. The high voltage terminations shall each be enclosed with the following:

1. [] Throat
   a. A throat is used on a transformer with sidewall-mounted bushings for connecting the transformer with bus duct. It extends 8 inches above and below the centerline of the bushings.
2. [x] Flange (required with high voltage air disconnect switch)
   a. A flange is used on a transformer with sidewall mounted bushings for direct connection to metal clad switchgear and is required with the high voltage air disconnect switch option. The flange extends 8 inches above and 32 inches below the bushing centerline.
3. [] Partial height, bottom entry air terminal chamber
   a. The partial height bottom entry chamber extends approximately 24 inches below the centerline of the bushings and has a bottom removable plate that can accommodate cable glands or conduit hubs. The chamber shall include [a hinged door with padlockable handle and a [pentahead] [hexhead] bolt] [a lift-off front panel].
4. [] Partial height, top entry air terminal chamber
   a. The partial height top entry air terminal chamber has a chimney with a removable cover that extends 24 inches above the bushing centerline and can be equipped with cable glands or conduit hubs. Bus duct can be adapted to match the top of the chimney for bus termination. [a hinged door with padlockable handle and a [pentahead] [hexhead] bolt] [a lift-off front panel].

5. [] Full height, bottom entry cabinet

   a. A full height bottom entry air terminal chamber is a weather-resistant metal enclosure around sidewall mounted bushings that extends downward to the transformer base level and upward approximately 10 inches above the bushing centerline. It is intended for underground feed and is provided with facilities for distribution arresters. [a hinged door with padlockable handle and a [pentahead] [hexhead] bolt] [a lift-off front panel].

6. [] Full height, top entry cabinet

   a. A full height top entry air terminal chamber is a weather resistant metal enclosure around sidewall mounted bushings that extends downward to the transformer base level and upward approximately 24 inches above the centerline of the bushings. The chamber shall include [a hinged door with padlockable handle and a [pentahead] [hexhead] bolt] [a lift-off front panel].

H. The low voltage terminations shall each be enclosed with the following:

1. [x] Throat

   a. A throat is used on a transformer with sidewall-mounted bushings for connecting the transformer with bus duct. It extends 8 inches above and below the centerline of the bushings.

2. [] Flange

   a. A flange is used on a transformer with sidewall mounted bushings for direct connection to metal clad switchgear and is required with the high voltage air disconnect switch option. The flange extends 8 inches above and 32 inches below the bushing centerline.

3. [] Partial height, bottom entry air terminal chamber

   a. The partial height bottom entry chamber extends approximately 24 inches below the centerline of the bushings and has a bottom removable plate that can accommodate cable glands or conduit hubs. The chamber shall include [a hinged door with padlockable handle and a [pentahead] [hexhead] bolt] [a lift-off front panel].

4. [] Partial height, top entry air terminal chamber

   a. The partial height top entry air terminal chamber has a chimney with a removable cover that extends 24 inches above the bushing centerline and can be equipped with cable glands or conduit hubs. Bus duct can be adapted to match the top of the chimney for bus termination. [a hinged door with padlockable handle and a [pentahead] [hexhead] bolt] [a lift-off front panel].

5. [] Full height, bottom entry cabinet

   a. A full height bottom entry air terminal chamber is a weather-resistant metal enclosure around sidewall mounted bushings that extends downward to the transformer base level and upward approximately 10 inches above the bushing centerline. It is intended for underground feed and is provided with facilities for distribution arresters. [a hinged door with padlockable handle and a [pentahead] [hexhead] bolt] [a lift-off front panel].

6. [] Full height, top entry cabinet

   a. A full height top entry air terminal chamber is a weather resistant metal enclosure around sidewall mounted bushings that extends downward to the transformer base level and upward approximately 24 inches above the centerline of the bushings. The chamber shall include [a hinged door with padlockable handle and a [pentahead] [hexhead] bolt] [a lift-off front panel].

I. The tank shall be complete with an anodized aluminum laser engraved nameplate. This nameplate shall meet IEEE Std C57.12.00™-2015 standard for Nameplate B.

J. Overcurrent protection and switching

1. The optional overcurrent protection scheme provided with the transformer shall consist of one of following attributes. If for any reason a special protection scheme is required it shall be clearly stated on the inquiry.

a. [] The high-voltage overcurrent protection scheme provided with the transformer shall be a loadbreak Bay-O-Net assembly with a flapper valve to minimize oil spillage. Overcurrent protection shall be provided by a Bay-O-Net expulsion fuse mounted in series with partial range under-oil ELSP current-limiting fuses with a maximum interrupting rating of 50,000 A rms symmetrical.

b. [] Integral vacuum fault interrupter (VFI): (available from 13 amps up to 900 amps of full-load transformer current, up to 34.5 kV, grounded wye or delta, maximum 150 KV BIL) The high-voltage or low-voltage overcurrent protection scheme provided with the transformer shall be an integral Vacuum Fault Interrupter (VFI). The VFI shall have a maximum symmetrical interrupting rating of [12,000 A at 15 kV] [16,000 A at 15 kV] [12,000 A at 25 kV] [12,000 A at 35 kV] with resettable fault protection up through 35 kV. The VFI shall also include a Tri-Phase electronic breaker control with over 100 minimum trip settings and five (5) selectable time current curves. The minimum trip setting shall be XX amps, and curve profile shall be the EF, KF, TF, F, or H (Re: Bulletin B210-02039 and Service Information S285-75-1 for the electronic control).

1) [] Optional ELSP Accessory: VFI shall be in series with ELSP under-oil partial-range current-limiting back-up fuses with an interrupting rating of 50,000 A.

2) [] Optional TPG control

3) [] Optional SCADA board (Requires TPG control)

4) [] Optional motor operator assembly and control

5) [] Optional motor operator provisions

6) [] Optional [visible break window] [visible break and ground window]

c. [x] Primary Air Load-break Switch 15kV 600A shall be provided that is in accordance with IEEE Std C37.20.3™-2013 standard and NEMA® SG-5. The switch shall include an EPR-insulated copper cable transition and provisions for mounting surge arresters. The switch shall be a three-pole, two-position gang operated air interrupter to include a manual stored energy mechanism for ease of operation. The switch shall be enclosed in modular self-supporting, bolted design including an electrostatically applied paint finish exceeding IEEE Std C37.20.3™-2013 standard and a 500 W cabinet heater.

1) [] The transformer primary shall be non-fused. It shall include a copper bus transition to the transformer. Note: Required when full load current exceeds 600A.

2) [] The transformer primary air load-break switch shall include non-disconnect power fuses.

3) [] The transformer primary air load-break switch shall include disconnect power fuses.

4) [x] The transformer primary air load-break switch shall include current-limiting non-expulsion power fuses.

2.04 ACCESSORIES

A. The following standard accessories shall be provided:
   1. De-energized tap-changer
   2. 1.0” upper fill plug with filter press connection
   3. 1.0” drain valve with sampling device
   4. Cover-mounted automatic pressure relief device
   5. Welded cover with bolted manhole
   6. Lifting lugs (4)
   7. Liquid level gauge
   8. Dial type thermometer
   9. Pressure/vacuum gauge
   10. SS ground pads (4)
   11. Nitrogen blanket with purge valve
   12. Touch-up paint (2 aerosol cans)

B. The following optional accessories shall be provided if specified:
   1. [] Copper low voltage bushings (standard with all-copper windings)
   2. [] Bleeder valve
   3. [x] NEMA® 4 control box (standard with fan package)
   4. [] NEMA® 4X control box (stainless steel)
   5. [] NEMA® 7 control box (explosion proof)
   6. [x] Rapid pressure rise relay
   7. [] Seal-in panel for rapid pressure rise relay
   8. [x] Forced air fan control package
   9. [] Winding temperature indicator
   10. [] Auxiliary contacts for liquid level gauge
   11. [] Auxiliary contacts for dial type thermometer (standard with fan package)
   12. [] Auxiliary contacts for pressure/vacuum gauge
   13. [] Auxiliary contacts for pressure relief device
   14. [] 1.0” globe-type upper fill valve

C. Special Features
   1. The following special features may be provided if specified:
   2. [x] All copper windings

2.05 FINISH PERFORMANCE REQUIREMENTS

A. The tank coating shall meet all requirements in IEEE Std C57.12.28™-2014 standard including:
   1. Salt Spray
   2. Crosshatch adhesion
   3. Humidity
   4. Impact
   5. Oil resistance
   6. Ultraviolet accelerated weathering
   7. Abrasion resistance–taber abraser

PART 3 EXECUTION

3.01 PRODUCTION TESTING

A. All units shall be tested for the following:
   1. Ratio, polarity and phase relation tests using all tap settings
   2. Winding resistance measurement tests
   3. Insulation power factor
   4. Full wave and reduced wave impulse test
   5. Applied and Induced potential tests
   6. No-Load losses at rated current
   7. Total losses at rated current
   8. Percent impedance at rated current
   9. Excitation current (100% voltage) test
   10. Leak test

B. Transformers shall conform to efficiency levels for liquid immersed distribution transformers, as specified in the Department of Energy ruling “10 CFR Part 431 Energy Conservation Program: Energy Conservation Standards for Distribution Transformers; Final Rule; April 18, 2013.” Manufacturer shall comply with the intent of all regulations set forth in noted ruling (commonly referred to as DOE 2016).

C. The manufacturer shall provide certification for all design and other tests listed in IEEE Std C57.12.00™-2010 standard, including verification that the design has passed short circuit criteria per IEEE Std C57.12.00™-2010 and IEEE Std C57.12.90™-2010 standards.

D. Manufacturer shall conform to guaranteed average losses as specified in IEEE Std C57.12.00™-2010 standard. The no-load losses of a transformer shall not exceed the specified no-load losses by more than 10%, and the total losses of a transformer shall not exceed the specified total losses by more than 6%.

3.02 SHIPPING

A. Transformers shall be loaded and unloaded with overhead cranes. No pallet shall be provided.

3.03 DATA WITH PROPOSAL

A. The following data shall be submitted with the proposal:

1. Core losses (when requested per Sections 3.01 D).
2. Winding losses (when requested per Sections 3.01 D).
3. Percent impedance
4. Typical bid drawing

B. The following checked data shall be submitted with the proposal:

1. [] Exciting Current @ 100% and 110% rated Voltage.
2. [x] Efficiencies must be provided at loading levels of 100%, 75%, 50%, and 25%.
3. [] Percent regulation must be provided at 0.8 PF and 1.0 PF.

3.04 DRAWINGS

A. The following will be provided by request after receipt of order:

1. [x] Construction drawings
2. [x] Record drawings
3. [] Approval drawings
4. [] CAD drawings

3.05 SERVICE

A. The manufacturer of the transformer shall have regional service centers located within 2 hours flight time of all contiguous 48 states. Service personnel shall be factory trained in commissioning and routine service of quoted transformers.

3.06 FIELD TESTING

A. Contractor to hire 3rd party testing agency to perform ANSI/NETA tests on-site.

SECTION 26 13 16.13

MEDIUM VOLTAGE LOAD INTERRUPTER SWITCHGEAR

PART 1 GENERAL

1.01 SCOPE

A. The Contractor shall furnish and install the medium voltage load interrupter switchgear as specified herein and as shown on the contract drawings.

1.02 REFERENCES

A. The medium voltage load interrupter switchgear and all components shall be designed, manufactured and tested in accordance with the latest applicable standards as follows:

   a. ANSI/IEEE C37.20.3

   b. ANSI/IEEE C37.20.4

   c. ANSI C37.22

   d. ANSI C37.57, C37.58

   e. CSA 22.2 No.31-M89 (5/15 kV ratings only)

   f. EEMAC G8-3.3

B. Listing by Underwriters Laboratories (UL) or Canadian Standards Association (CSA) shall be provided for 5 kV or 15 kV class medium voltage load interrupter switchgear.

1.03 SUBMITTALS – FOR REVIEW/APPROVAL

A. The following information shall be submitted to the Engineer:

   a. Master drawing index

   b. Front view elevation

   c. Floor plan

   d. Top view

   e. Single line

   f. Nameplate schedule

   g. Component list

   h. Conduit entry/exit locations

   i. Assembly ratings including:

      a. Short-circuit rating

      b. Voltage

      c. Continuous current

      d. Basic Impulse Level

j. Major component ratings including:

a. Voltage

b. Continuous current

c. Interrupting ratings

k. Cable terminal sizes

B. Where applicable or required by the Engineer the following additional information shall be submitted to the Engineer:

a. Bus duct connection

b. Connection details between close-coupled assemblies

c. Composite floor plan of close-coupled assemblies

d. Electrical schematic diagram

e. Key interlock scheme drawing and sequence of operations

f. Descriptive bulletins

g. Product data sheets

1.04 SUBMITTALS – FOR CONSTRUCTION

A. The following information shall be submitted for record purposes:

a. Final as-built drawings and information for items listed in Paragraph 1.04, and shall incorporate all changes made during the manufacturing process

b. Wiring diagrams

c. Certified production test reports

d. Installation information including equipment anchorage provisions

e. Seismic certification as specified

1.05 QUALIFICATIONS

A. The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.

B. For the equipment specified herein, the manufacturer shall be ISO 9001 or 9002 certified.

C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

D. Provide Seismic tested equipment as follows:

a. The equipment and major components shall be suitable for and certified by actual seismic testing to meet all applicable seismic requirements of the latest California Building Code (CBC).

b. The Project Structural Engineer will provide site specific ground motion criteria for use by the manufacturer to establish SDS values required.

c. The IP rating of the equipment shall be 1.5

d. The Structural Engineer for the Site will evaluate the SDS values published on the Manufacturer's or OSHPD website to ascertain that they are "equal to" or "greater than" those required for the Project Site.

e. The following minimum mounting and installation guidelines shall be met, unless specifically modified by the above referenced standards.

   a. The Contractor shall provide equipment anchorage details, coordinated with the equipment mounting provision, prepared and stamped by a licensed structural engineer in the state. Mounting recommendations shall be provided by the manufacturer based upon the above criteria to verify the seismic design of the equipment.

   b. The equipment manufacturer shall certify that the equipment can withstand, that is, function following the seismic event, including both vertical and lateral required response spectra as specified in above codes.

   c. The equipment manufacturer shall document the requirements necessary for proper seismic mounting of the equipment. Seismic qualification shall be considered achieved when the capability of the equipment, meets or exceeds the specified response spectra.

1.06 DELIVERY, STORAGE AND HANDLING

A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

B. Each switchgear assembly shall be split into shipping groups for handling as indicated on the drawings or per the manufacturer's recommendations. Shipping groups shall be designed to be shipped by truck, rail or ship. Shipping groups shall be bolted to skids. Accessories shall be packaged and shipped separately. Each switchgear shipping group shall be equipped with lifting eyes for handling solely by crane.

1.07 OPERATION AND MAINTENANCE MANUALS

A. Equipment operation and maintenance manuals shall be provided with each assembly, and shall include instruction leaflets and instruction bulletins for the complete assembly and each major component.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Eaton

B. IEM

C. Or approved equal

The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the Engineer ten (10) days prior to bid date.

2.02 RATINGS

A. Switchgear assembly ratings shall be as follows:

a. Nominal System Voltage	15 kV three-phase three wire

b.	System Grounding	Solid
c.	Main Cross Bus Continuous Current	600 A
d.	Maximum Design Voltage	15 kV
e.	BIL	95 kV
f.	Main Cross Bus Momentary Current (10 Cycle)	61 kA Asymmetrical RMS
g.	Main Cross Bus 2-Second short circuit current	38kA Symmetrical RMS
h.	Non-Fused Switch (Continuous and Load Break)	600Amperes
i.	Non-Fused Momentary withstand	40kA Asym rms
j.	Non-Fused Switch Fault close (3 times, minimum for 4.76 & 15 kV)	61kA Asymmetrical
k.	Non-Fused Switch 2-Second Short Circuit Current	38kA Sym RMS
l.	Type of Fuse	CLE
m.	Fuse Interrupting Rating	14.4 kA Sym RMS
n.	Fuse Rating	Sized per manufacturer requirements
o.	Fused Switch Fault close	23 kA Asym RMS

2.03 15 KV CONSTRUCTION

A. The metal-enclosed load interrupter switchgear shall consist of deadfront, completely metal-enclosed vertical sections containing load interrupter switches and fuses (where shown) of the number, rating and type noted on the drawings or specified herein.

B. The following features shall be supplied on every vertical section containing a three-pole, two-position open-closed switch:

   a. A minimum 8-inch x 16-inch high-impact viewing window that permits full view of the position of all three switch blades through the closed door. The window shall not be more than 58 inches above the switch pad level to allow ease of inspection.

   b. The door shall be interlocked with the switch so that:

      a. The switch must be opened before the door can be opened

      b. The door must be closed before the switch can be closed

   c. A hinged grounded metal barrier that is bolted closed in front of every switch to prevent inadvertent contact with any live part, yet allows for a full-view inspection on the switch blade position

   d. Provision for padlocking the switch in the open or closed position

   e. Green OPEN, Red CLOSED switch position indicators with the words “Open” and “Closed” in French, Spanish and English

   f. A hinged cover with rustproof quarter turn nylon latches over the switch operating mechanism to discourage casual tampering

   g. The switch shall be removable from the structure as a complete operational component

C. Vertical section construction shall be of the universal frame type using die-formed and bolted parts. All enclosing covers and doors shall be fabricated from steel whose thickness shall be equal to or greater than those specified in ANSI/IEEE C37.20.3. No owner removable hardware for covers or doors shall be thread-forming type. To facilitate installation and maintenance of cables and bus in each vertical section, a split removable top cover and padlockable hinged rear door held closed by bolts shall be provided. A G90 grade galvanized base shall isolate equipment from contact with the concrete pad providing protection from rust. Heavy-duty hot dipped galvanized anchor clips shall be provided to anchor the switchgear to the concrete pad.

D. Each vertical section containing a switch shall have a single, full-length, flanged front door and shall be equipped with two (2) rotary latch-type padlockable handles. Provision shall be made for operating the switch and storing the removable handle without opening the full length door.

E. Each load interrupter switch shall have the following features:

   a. Three-pole gang-operated mechanism

   b. Manual quick-make, quick-break over-toggle-type mechanism that does not require the use of a chain or a cable for operation, and utilizes a heavy-duty coil spring to provide opening and closing energy

   c. The speed of opening and closing the switch shall be independent of the operator, and it shall be impossible to tease the switch into any intermediate position under normal operation

   d. Separate main and break contacts to provide maximum endurance for fault close and load interrupting duty

   e. Insulating barriers between each phase and between the outer phases and the enclosure

   f. A maintenance provision for slow closing the switch to check switch blade engagement and slow opening the switch to check operation of the arc interrupting contacts.

2.04 BUS

A. All phase bus conductors shall be tin-plated copper.

B. Ground bus shall be silver-plated copper and be directly fastened to a galvanized metal surface of each vertical section, and be of a size sufficient to carry the rated (2-second) current of the switchgear assembly.

C. A neutral bus shall be provided only when indicated on the drawings. It shall be insulated for 1000 Vac to ground. The current rating of the neutral bus shall be 600 amperes.

2.05 BUS INSULATION SYSTEM

A. All bus shall be supported utilizing a high strength and high creep, support providing 10.5-inch of creep distance between phases and ground. The molded fins shall be constructed of high track resistant silicone rubber.

B. All standoff insulators on switches and fuse mountings shall be glass polyester.

2.06 WIRING/TERMINATIONS

A. One (1) terminal pad per phase shall be provided for attaching contractor-supplied cable terminal lugs for a maximum of two (2) conductors per phase of the sizes indicated on the drawings. Sufficient space shall be allowed for contractor supplied electrical stress relief termination devices.

B. Small wiring, fuse blocks and terminal blocks within the vertical section shall be furnished as indicated on the drawings. Each control wire shall be labeled with wire markers. Terminal blocks shall be provided for owner’s connections to other apparatus.

2.07 FUSES

A. Fault protection shall be provided by fuses with continuous ratings as shown in the contract documents. Furnish three (3) spare fuses for each fused switch. Any fuse/switch integrated momentary and fault close ratings specified shall have been verified by test and UL and CSA certified.

2.08 OWNER METERING

A. Provide owner metering in the switch structure on a hinged panel to provide safe isolated access to meters and all associated terminal and fuse blocks for maintenance, calibration or testing while the gear is energized.

B. Provide ring-type current transformers for metering as shown on drawings. Current transformers shall be wired to shorting-type terminal blocks.

C. Voltage transformers or resistive voltage dividers shall be supplied

a. The voltage transformers shall be mounted on tilt-out trunnions or drawout drawer assemblies and equipped with current limiting primary fuses. In the withdrawn position, the fuses and the potential transformers shall be disconnected and grounded to permit safe inspection and/or replacement of the fuses. The trunnion frame shall be connected to ground by a flexible copper cable that is attached directly to the frame. The mechanism shall be arranged so that full access to potential transformers or fuses cannot be accomplished until they are disconnected from high voltage and grounded. Live parts shall be isolated when the voltage transformers are in the withdrawn position to prevent accidental contact by operating or maintenance personnel. Stationary contacts shall be silver plated copper and mounted on porcelain or glass polyester supports. Cables connected to voltage transformer primaries shall be rated for the full voltage and BIL rating of the switchgear.

b. Resistive voltage dividers can be used in place of voltage transformers. Resistive voltage dividers shall carry the same rating as the specified voltage transformers. They are to be mounted in the cable compartment of the switchgear assembly. Resistive voltage dividers must consist of 4 total non-inductive resistors (two paralleled medium voltage resistors and two paralleled low voltage resistors). When the nominal service voltage is applied, the resistive voltage divider system shall provide a 120 V signal to the auxiliary devices for protection and controls. The resistive voltage divider system shall be agnostic of the auxiliary devices to which they connect.

D. System shall be a Microprocessor-Based Metering System with network connectivity.

E. Web-Enabled Communications

a. Provide a separate compartment with a front facing hinged door as a central point of connection for all internally located communicating devices to an external Ethernet network and allow monitoring of the power infrastructure with real-time, web-enabled data.

b. The compartment shall have a lockable, hinged door with a functional through-the-door RJ45 network access port. Power for the components in the compartment shall be supplied by a pre-wired, bus-connected control transformer in the compartment that is fused and has a disconnecting means.

c. The included communications components shall be a Power Xpert Gateway, or approved equal, and shall have the following features:

a. The communication system network shall be Eaton PowerXpert Architecture, or approved equal.

b. Each load interrupter switch position (open and closed), where shown, shall be communicated via an addressable relay. This relay shall communicate over the network.

The relay shall monitor an auxiliary switch contact that monitors the primary switch position and shall be rated for the application. Each relay shall have a unique address so that it is possible to “call up” and “read” each load interrupter switch’s position from a host computer

c. A blown high voltage fuse condition on each set of three (3) fuses shall be monitored by an addressable relay. Any blown fuse operation shall be communicated immediately over the network via the monitoring addressable relay. Each relay shall have a unique address so that it is possible to “call up” and “read” a fuse blown operation for a set of fuses with the communication system

d. The manufacturer shall wire between all communication capable devices within the switchgear, including electronic meters with the same protocol and wire to a set of easily accessible terminal blocks

e. Control power for addressable relays shall be 120 volts, 60 Hz available from a fused control transformer.

2.09 ACCESSORIES

A. Supply key interlocks as shown on the drawings.

B. Furnish distribution class surge arresters with ratings in accordance with manufacture’s recommendations.

2.10 TRANSFORMER CONNECTIONS

a. A transformer primary load interrupter switch shall include the following when connecting to an indoor or outdoor liquid filled transformer, such as mineral oil, FR3, or silicone filled transformer

a. Cable or bus bar connection from the load side of the fuse (or load side of an unfused switch) to the HV bushing terminal pad on the primary of the transformer.

b. Include a connection for the ground bar to connect the switch enclosure to the transformer enclosure

2.11 A 20”W BUS TRANSITION SECTION SHALL BE PROVIDED. IF OUTDOOR, PROVIDE A 15” THROAT WITH A 5” FLANGE (20” ALTOGETHER) WITH FLANGE DIMENSIONS TO MATCH THE DIMENSIONS OF THE TRANSFORMER FLANGE.ENCLOSURES

A. Enclosures shall be constructed per IEEE/ANSI C37.20.3 Outdoor specifications. (Exceeds NEMA 3R.)

B. Each vertical section shall have a sloped weatherproof roof with labyrinth shaped joints. Use of gasket or caulking to make roof joints weatherproof shall not be permitted. All exterior openings shall be screened to prevent the entrance of small animals and barriered to inhibit the entrance of snow, sand, etc. A minimum of one (1) 250-watt, 120-volt space heater shall be provided in each vertical section. Power for the space heater(s) shall be furnished by a control power transformer mounted in the switchgear or by a transformer mounted within the low voltage switchboard/switchgear. The design shall be non-walk-in type.

C. Each vertical section shall be ventilated at the top and bottom, both front and rear, to allow airflow to provide cooling and help prevent buildup of moisture within the structure. The ventilated covers shall be externally removable to allow safe maintenance of the filter media without providing access to live parts.

2.12 NAMEPLATES

A. A nameplate shall be mounted on the front door of each switch vertical section in accordance with the drawings.

2.13 FINISH

A. Prior to assembly, all enclosing steel shall be thoroughly cleaned and phosphatized. A powder coating shall be applied electrostatically, then fused-on by baking in an oven. The coating is to have a thickness of not less than 1.5 mils. The finish shall have the following properties:

Impact resistance (ASTM D-2794)	60 direct/60 indirect
Pencil hardness (ASTM D-3363)	H
Flexibility (ASTM D-522)	Pass 1/8-inch mandrel
Salt spray (ASTM B117-85 [20])	600 hours
Color	ANSI 61 gray

PART 3 EXECUTION

3.01 FACTORY TESTING

A. Standard factory tests shall be performed on the equipment under this section. All tests shall be in accordance with the latest version of ANSI and NEMA standards.

B. The manufacturer shall provide three (3) certified copies of factory test reports.

3.02 FIELD QUALITY CONTROL

A. Provide the services of a qualified factory-trained manufacturer's representative to assist the Contractor in installation and startup of the equipment specified under this section for a period of 2 working days. The manufacturer's representative shall provide technical direction and assistance to the Contractor in general assembly of the equipment, connections and adjustments, and testing of the assembly and components contained therein.

B. The Contractor shall provide three (3) copies of the manufacturer's field startup report.

3.03 MANUFACTURER'S CERTIFICATION

A. The Contractor shall provide a qualified factory-trained manufacturer's representative shall certify in writing that the equipment has been installed, adjusted and tested in accordance with the manufacturer's recommendations.

B. The Contractor shall provide three (3) copies of the manufacturer's representative's certification.

3.04 TRAINING

A. The Contractor shall provide a training session for up to five (5) owner's representatives for 2 normal workdays at a job site location determined by the owner.

B. The training session shall be conducted by a manufacturer's qualified representative and consist of instruction on the assembly, switches and major components.

3.05 INSTALLATION

A. The Contractors shall install all equipment per the manufacturer's recommendations and the contract drawings.

B. All necessary hardware to secure the assembly in place shall be provided by the Contractor.

SECTION 26 24 13.11

SWITCHBOARDS – LOW VOLTAGE

PART 1 GENERAL

1.01 SCOPE

A. The Contractor shall furnish and install, where indicated, a free-standing, dead-front type low voltage distribution switchboard, utilizing group mounted circuit protective devices as specified herein, and as shown on the contract drawings.

1.02 RELATED SECTIONS

1.03 REFERENCES

A. The low voltage distribution switchboards and all components shall be designed, manufactured and tested in accordance with the latest applicable following standards:

1. NEMA PB-2
2. UL Standard 891
3. UL standard 1066
4. UL standard 489
5. UL Standard 1449 4th edition

1.04 SUBMITTALS – FOR REVIEW/APPROVAL

1.05 SUBMITTALS – FOR CONSTRUCTION

1.06 QUALIFICATIONS

A. The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.

B. For the equipment specified herein, the manufacturer shall be ISO 9001 or 9002 certified.

C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

D. Where noted in the contract documents provide seismic qualified equipment.

1.07 REGULATORY REQUIREMENTS

A. The low-voltage switchboard shall be UL labeled.

1.08 DELIVERY, STORAGE AND HANDLING

A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.09 OPERATION AND MAINTENANCE MANUALS

A. Equipment operation and maintenance manuals shall be provided with each assembly shipped and shall include instruction leaflets, instruction bulletins and renewal parts lists where applicable, for the complete assembly and each major component.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. IEM, Eaton, or approved equal.

The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the Engineer ten (10) days prior to bid date. Manufacturer chosen must also be able to meet construction schedule.

2.02 RATINGS

A. The assembly shall be rated to withstand mechanical forces exerted during short-circuit conditions when connected directly to a power source having available fault current of 65,000 amperes symmetrical at rated voltage or as shown on the contract documents.

B. Bus voltage and current rating to be as indicated on the contract documents.

2.03 CONSTRUCTION

A. Switchboard shall consist of the required number of vertical sections bolted together to form a rigid assembly. The sides and rear shall be covered with removable bolt-on covers. All edges of front covers or hinged front panels shall be formed. Provide adequate ventilation within the enclosure.

B. All sections of the switchboard shall be front and rear aligned with depth as shown on the drawings. All protective devices shall be group mounted. Devices shall be front removable and load connections front accessible enabling switchboard to be mounted against a wall.

C. The assembly shall be provided with adequate lifting means.

D. The switchboard shall be equal to Eaton type Pow-R-Line C utilizing the components herein specified and as shown on the drawings.

E. The switchboard shall be suitable for use as service entrance equipment and be labeled in accordance with UL requirements.

2.04 BUS

A. All bus bars shall be silver-plated copper. Main horizontal bus bars shall be mounted with all three phases arranged in the same vertical plane. Bus sizing shall be based on NEMA standard temperature rise criteria.

B. Provide a full capacity neutral bus where a neutral bus is indicated on the drawings.

C. A 1/4 x 2 inch copper ground bus (minimum) shall be furnished firmly secured to each vertical section structure and shall extend the entire length of the switchboard.

D. All hardware used on conductors shall be high-tensile strength and zinc-plated. All bus joints shall be provided with conical spring-type washers.

2.05 WIRING/TERMINATIONS

A. Small wiring, necessary fuse blocks and terminal blocks within the switchboard shall be furnished as required. Control components mounted within the assembly, such as fuse blocks, relays,

pushbuttons, switches, etc., shall be suitably marked for identification corresponding to appropriate designations on manufacturer's wiring diagrams.

B. Mechanical-type terminals shall be provided for all line and load terminations suitable for copper or aluminum cable rated for 75 degrees C of the size as indicated on the drawings.

C. Lugs shall be provided in the incoming line section for connection of the main grounding conductor. Additional lugs for connection of other grounding conductors shall be provided as indicated on the drawings.

D. All control wire shall be type SIS, bundled and secured with nylon ties. Insulated locking spade terminals shall be provided for all control connections, except where saddle type terminals are provided integral to a device. All current transformer secondary leads shall first be connected to conveniently accessible short-circuit terminal blocks before connecting to any other device. All groups of control wires leaving the switchboard shall be provided with terminal blocks with suitable numbering strips. Provide wire markers at each end of all control wiring.

2.06 MAIN AND TIE PROTECTIVE DEVICES

A. Protective devices shall be fixed mounted insulated case low-voltage circuit breakers, Eaton type NRX or approved equal. All breakers shall be UL listed for application in their intended enclosures for 100% of their continuous ampere rating.

B. Main and tie breakers shall be true two-step stored energy devices and shall be manually operated unless otherwise indicated on contract documents.

C. All main and tie circuit breakers shall have a minimum symmetrical interrupting capacity of 65,000 amperes. Main and tie circuit breakers shall have 30-cycle short-time withstand ratings equal to interrupting capacity up to 42kA.

D. All main and tie insulated case circuit breakers shall be UL489 listed.

E. All insulated case circuit breakers shall have a nameplate clearly marking any electrical accessories that are mounted in the breaker at the time of sale. The accessory shall have a label that will indicate its function and voltage. All accessories shall be modular, plug and lock type, and UL listed for easy field installation.

F. The breaker control interface shall have color-coded visual indicators to indicate contact open or closed positions as well as mechanism charged and discharged positions. Manual control pushbuttons on the breaker face shall be provided for opening and closing the breaker. The power circuit breaker shall have a "Positive On" feature. The breaker flag will read "Closed" if the contacts are welded and the breaker is attempted to be tripped or opened.

G. Each molded case circuit breaker shall be equipped with a true RMS sensing, solid-state tripping system consisting of at least three current sensors microprocessor-based trip device and trip actuator. The trip unit shall use microprocessor-based technology to provide the basic adjustable time-current protection.

H. Provide trip units with integral arc flash reduction mode for 1200A frame and above. The use of zone selective interlocking to emulate this feature does not meet the intent of these specifications and will not be allowed.

I. Where noted on the contract documents provide zone selective interlocking between trip units.

J. System coordination shall be provided by adjusting rotary switches for the following microprocessor-based time-current curve shaping adjustments:

1. Adjustable long-delay pick-up setting with minimum of 10 settings

2. Adjustable long-delay time - 0.5 to 24 seconds

3. Adjustable short-delay pick-up setting – 1.5x to Max allowable by frame

4. Adjustable short-delay time 0.0 sec up to 0.5 sec depending on frame with selectable flat or I2t curve shaping
5. Adjustable instantaneous setting 2x to Max allowable by frame
6. Where indicated, adjustable ground fault current pickup (0.2 – 1.0 x In in 0.10x increments) and time (0.1 – 1.0 sec in 0.10sec increments), with selectable flat or I^2t curve shaping. Provide switch selectable options for GF OFF, GF alarm, or GF trip.

K. Where indicated provide 100% rated UL listed circuit breakers.

L. Trip units shall be capable of metering phase, neutral, and ground current with an accuracy of +/- 2.0% of the reading.

M. Trip units shall include embedded Modbus RTU communication capability. Breaker status and all monitored parameters shall be available.

N. Trip units shall collect and store pertinent information to the trip unit and circuit breaker health and event history. The trip unit shall also include diagnostic features to allow the user to investigate events and dynamically monitor the health of the trip unit and the breaker.

1. Number of operations (load and no-load)
2. Number of trips (overload trips, short circuit trips)
3. Run time
4. Breaker ambient temperature.
5. Breaker remaining life - Then the trip unit shall utilize an algorithm that applies a weighted value to all of these inputs to determine the remaining life of the breaker. The remaining life of the breaker shall be displayed or communicated in calculated percentage of life remaining.
6. All breaker health information shall be available via hard wire connection to a PC and via communications.
    1) trip unit shall perform a waveform capture on trip, alarm, or user-initiated events.
        a) Any breaker trip event shall capture a 10-cycle waveform. The trip unit shall store the most recent trip event waveform.
        b) Any alarm event or user-initiated waveforms shall capture a 1-cycle waveform.
        c) Waveform events shall capture and store all phase, neutral and ground currents.

2.07 FEEDER PROTECTIVE DEVICES

A. All feeder protective devices shall be Eaton or approved equal molded case circuit breakers with inverse time tripping characteristics.

B. Circuit breakers shall be operated by a toggle-type handle and shall have a quick-make, quick-break over-center switching mechanism that is mechanically trip-free. Automatic tripping of the breaker shall be clearly indicated by the handle position. Contacts shall be non-welding silver alloy and arc extinction shall be accomplished by means of DE-ION arc chutes. A push-to-trip button on the front of the circuit breaker shall provide a local manual means to exercise the trip mechanism.

C. Circuit breakers shall have a minimum symmetrical interrupting capacity as indicated on the contract documents.

D. All molded case circuit breakers shall be equipped with a true RMS sensing, solid-state tripping system consisting of at least three current sensors microprocessor-based trip device and trip

actuator. The trip unit shall use microprocessor-based technology to provide the basic adjustable time-current protection.

E. Provide trip units with integral arc flash reduction mode for 1200A frame and above. The use of zone selective interlocking to emulate this feature does not meet the intent of these specifications and will not be allowed.

F. System coordination shall be provided by adjusting rotary switches for the following microprocessor-based time-current curve shaping adjustments:

1. Adjustable long-delay pick-up setting with minimum of 10 settings
2. Adjustable long-delay time - 0.5 to 24 seconds
3. Adjustable short-delay pick-up setting – 1.5x to Max allowable by frame
4. Adjustable short-delay time 0.0 sec up to 0.5 sec depending on frame with selectable flat or I2t curve shaping
5. Adjustable instantaneous setting 2x to Max allowable by frame
6. Where indicated, adjustable ground fault current pickup (0.2 – 1.0 x In in 0.10x increments) and time (0.1 – 1.0 sec in 0.10sec increments), with selectable flat or I^2t curve shaping. Provide switch selectable options for GF OFF, GF alarm, or GF trip.

G. Where indicated provide 100% rated UL listed circuit breakers.

H. Trip units shall be capable of metering phase, neutral, and ground current with an accuracy of +/- 2.0% of the reading.

I. Trip units shall include embedded Modbus RTU communication capability. Breaker status and all monitored parameters shall be available.

J. Trip units shall collect and store pertinent information to the trip unit and circuit breaker health and event history. The trip unit shall also include diagnostic features to allow the user to investigate events and dynamically monitor the health of the trip unit and the breaker.

1. Number of operations (load and no-load)
2. Number of trips (overload trips, short circuit trips)
3. Run time
4. Breaker ambient temperature.
5. Breaker remaining life - The trip unit shall utilize an algorithm that applies a weighted value to monitored information to determine the remaining life of the breaker. The remaining life of the breaker shall be displayed or communicated in calculated percentage of life remaining.
6. All breaker health information shall be available via hard wire connection to a PC and via communications.
    1) trip unit shall perform a waveform capture on trip, alarm, or user-initiated events.
        a) Any breaker trip event shall capture a 10-cycle waveform. The trip unit shall store the most recent trip event waveform.
        b) Any alarm event or user-initiated waveforms shall capture a 1-cycle waveform.
        c) Waveform events shall capture and store all phase, neutral and ground currents.

2.08 ACCESSORIES

A. Provide shunt trips, bell alarms and auxiliary switches as shown on the contract drawings.

2.09 MISCELLANEOUS DEVICES

A. Key interlocks shall be provided as indicated on the drawings.

B. Control power transformers with primary and secondary protection shall be provided, as indicated on the drawings, or as required for proper operation of the equipment.

C. For outdoor (NEMA 3R) installations, each section of the switchboard shall be provided with a thermostatically controlled space heater .

2.10 UTILITY METERING

A. Where indicated on the drawings, furnish a barrier to separate the utility metering compartment complete with hinged sealable door. Bus work shall include provisions for mounting utility company current transformers and potential transformers or potential taps as required by the utility company. Provide service entrance label and provide necessary applicable service entrance features per NEC and local code requirements.

2.11 SURGE PROTECTIVE DEVICE

A. SPD shall comply with ANSI/UL 1449 4th Edition or later listing by Underwriters Laboratories (UL).

B. Service entrance located SPDs shall be tested and demonstrate suitability for application within ANSI/IEEE C62.41 Category C environments.

C. The SPD shall be of the same manufacturer as the switchboard.

D. The SPD shall be factory installed integral to the switchboard by the original equipment manufacturer.

E. Locate the SPD on the load side of the main disconnect device, as close as possible to the phase conductors and the ground/neutral bar.

F. The SPD shall be connected through a disconnect (30A circuit breaker). The disconnect shall be located in immediate proximity to the SPD.

G. All monitoring and diagnostic features shall be visible from the front of the equipment.

H. Maintenance Free Design – The SPD shall be maintenance free and shall not require any user intervention throughout its life. SPDs containing items such as replaceable single-mode modules, replaceable fuses, or replaceable batteries shall not be accepted. SPDs requiring any maintenance of any sort such as periodic tightening of connections shall not be accepted. SPDs requiring user intervention to test the unit via a diagnostic test kit or similar device shall not be accepted.

I. Balanced Suppression Platform – The surge current shall be equally distributed to all MOV components to ensure equal stressing and maximum performance. The surge suppression platform must provide equal impedance paths to each matched MOV. Designs incorporating replaceable SPD modules shall not be accepted.

J. Electrical Noise Filter – Each Type 2 unit shall include a high-performance EMI/RFI noise rejection filter. Noise attenuation for electric line noise shall be up to 50 dB from 10 kHz to 100 MHz using the MIL-STD-220A insertion loss test method. Products unable able to meet this specification shall not be accepted.

K. Type 2 units with filtering shall conform to UL 1283 5th Edition

L. Type 1 units shall not contain filtering or have a UL 1283 5th Edition Listing.

M. Internal Connections – No plug-in component modules or printed circuit boards shall be used as surge current conductors. All internal components shall be soldered, hardwired with connections utilizing low impedance conductors.

N. Monitoring Diagnostics – Each SPD shall provide the following integral monitoring options:

1. Protection Status Indicators - Each unit shall have a green / red solid-state indicator light that reports the status of the protection on each phase.
2. For wye configured units, the indicator lights must report the status of all protection elements and circuitry in the L-N and L-G modes. Wye configured units shall also contain an additional green / red solid-state indicator light that reports the status of the protection elements and circuitry in the N-G mode. SPDs that indicate only the status of the L-N and L-G modes shall not be accepted.
3. For delta configured units, the indicator lights must report the status of all protection elements and circuitry in the L-G and L-L modes
4. The absence of a green light and the presence of a red light shall indicate that damage has occurred on the respective phase or mode. All protection status indicators must indicate the actual status of the protection on each phase or mode. If power is removed from any one phase, the indicator lights must continue to indicate the status of the protection on all other phases and protection modes. Diagnostics packages that simply indicate whether power is present on a particular phase shall not be accepted.
5. Remote Status Monitor – The SPD must include Form C dry contacts (one NO and one NC) for remote annunciation of its status. Both the NO and NC contacts shall change state under any fault condition.
6. Audible Alarm and Silence Button – The SPD shall contain an audible alarm that will be activated under any fault condition. There shall also be an audible alarm silence button used to silence the audible alarm after it has been activated.

O. Electrical Requirements:

1. Unit Operating Voltage – Refer to drawings for operating voltage and unit configuration.
2. Maximum Continuous Operating Voltage (MCOV) – The MCOV shall not be less than 115% of the nominal system operating voltage.
3. The suppression system shall incorporate thermally protected metal-oxide varistors (MOVs) as the core surge suppression component for the service entrance and all other distribution levels. The system shall not utilize silicon avalanche diodes, selenium cells, air gaps, or other components that may crowbar the system voltage leading to system upset or create any environmental hazards. End of life mode to be open circuit. Unit with end of life short-circuit mode are not acceptable.
4. Unit shall operate without the need for an external overcurrent protection device (OCPD), and be listed by UL as such. Unit must not require external OCPD or replaceable internal OCPD for the UL Listing.
5. Protection Modes – The SPD must protect all modes of the electrical system being utilized. The required protection modes are indicated by bullets in the following table:

	Protection Modes			
Configuration	L-N	L-G	L-L	N-G
Wye	●	●	●	●
Delta	N/A	●	●	N/A
Single Split Phase	●	●	●	●
High Leg Delta	●	●	●	●

6. Nominal Discharge Current (I_n) – All SPDs applied to the distribution system shall have a 20kA I_n rating regardless of their SPD Type (includes Types 1 and 2) or operating voltage. SPDs having an I_n less than 20kA shall be rejected.

7. ANSI/UL 1449 4th Edition Voltage Protection Rating (VPR) – The maximum ANSI/UL 1449 4th Edition VPR for the device shall not exceed the following:

Modes	208Y/120	480Y/277	600Y/347
L-N; L-G; N-G	700	1200	1500
L-L	1200	2000	3000

2.12 CUSTOMER METERING

A. Where indicated on the drawings, provide a separate customer metering compartment with a front facing hinged door and a UL listed microprocessor based multifunction power meter equal to Eaton PXM2280. Include current transformers wired to shorting-type terminal blocks for each meter. Provide fused potential taps as the potential source for metering as shown on the drawings.

B. The meter surge withstand shall conform to IEEE C37.90.1 and ANSI C62.41.

C. The meter shall accept a direct voltage input range of up to 576 Volts Line to Neutral, and a range of up to 721 Volts Line to Line.

D. The meter shall accept a current input of up to 10 amps continuous. Startup current for a 5A input shall be no greater than 0.005A.

E. Fault Current Withstand shall be 100 Amps for 10 seconds, 300 Amps for 3 seconds, and 500 Amps for 1 second.

F. The meter shall have an accuracy of +/- 0.1% or better for volts and amps, and 0.2% for power and energy functions. The meter shall meet the accuracy requirements of ANSI C12.20 (Class 0.2%).

G. The meter shall provide true RMS measurements of voltage, phase to neutral and phase to phase; current, per phase and neutral.

H. The meter shall provide sampling at 400+ samples per cycle on all channels measured readings simultaneously.

I. Meter shall provide per phase % THD and individual harmonic monitoring to the 40th order for current and for voltage L-N. Metered values shall include Volts, Amps, kW, kVAR, PF, kVA, Frequency, kWh, kVAh and kVARh. Provide 1 KYZ pulse output, on board meter limit exceeded alarms. Embedded web server shall support a waveform view of real time harmonic distortion and allow recording waveforms up to 64 samples per cycle. Meter shall have 768MB onboard memory for data logging.

J. The meter shall provide user configured fixed window or sliding window demand.

K. Meter shall provide a simultaneous voltage and current waveform recorder with programmable sampling rate.

L. The meter shall allow up to 1500 events to be recorded.

M. The meter shall be able to be configured and viewed from the on-board web server without the need for external software

N. The meter shall include a three-line, bright red, .56” LED display.

O. The meter must display a % of Load Bar on the front panel to provide an analog feel. The % Load Bar shall have not less than 10 segments.

P. The meter shall support Modbus RTU, Modbus ASCII, DNP 3.0, Ethernet TCP/IP, Modbus TCP, BACnet/IP, SNMP v1 & v3 (Network), SMTP (email), HTTP and HTTPS communication.

Q. Recording and logging shall be programmed for peak measurements based 1yr rolling data.

R. All software, licenses, factory technician setup shall be provided.

2.13 ENCLOSURES

A. NEMA 1 Enclosure for interior applications

B. Outdoor NEMA 3R Enclosure for outdoor applications.

1. Outdoor enclosure shall be non-walk-in and meet applicable NEMA 3R UL requirements
2. Enclosure shall have sloping roof downward toward rear.
3. The enclosure shall be provided with rear hinged doors for each section
4. Doors shall have provisions for padlocking
5. Ventilating openings shall be provided.
6. Provide thermostatically controlled space heaters for each structure to prevent the accumulation of moisture.
7. Power for space heaters, lights and receptacles.

2.14 NAMEPLATES

A. Engraved nameplates, mounted on the face of the assembly, shall be furnished for all main and feeder circuits as indicated on the drawings. Nameplates shall be laminated plastic, black characters on white background. Characters shall be 3/16-inch high, minimum. Nameplates shall give item designation and circuit number as well as frame ampere size and appropriate trip rating. Furnish master nameplate giving switchboard designation, voltage ampere rating, short-circuit rating, manufacturer’s name, general order number, and item number.

B. Control components mounted within the assembly, such as fuse blocks, relays, pushbuttons, switches, etc., shall be suitably marked for identification corresponding to appropriate designations on manufacturer’s wiring diagrams.

2.15 FINISH

A. All exterior and interior steel surfaces of the switchboard shall be properly cleaned and provided with a rust-inhibiting phosphatized coating. Color and finish of the switchboard shall be ANSI 61 light gray.

PART 3 EXECUTION

3.01 FACTORY TESTING

A. The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of ANSI and NEMA standards.

1. The switchboard shall be completely assembled, wired, adjusted, and tested at the factory. After assembly, the complete switchboard will be tested for operation under simulated

service conditions to assure the accuracy of the wiring and the functioning of all equipment. The main circuits shall be given a dielectric test of 2200 volts for one (1) minute between live parts and ground, and between opposite polarities. The wiring and control circuits shall be given a dielectric test of 1500 volts for one (1) minute between live parts and ground

B. The manufacturer shall provide three (3) certified copies of factory test reports.

3.02 MANUFACTURER'S CERTIFICATION

A. A certified test report of all standard production tests shall be available to the Engineer upon request.

3.03 TRAINING

A. The Contractor shall provide a training session for up to five (5) owner's representatives for 2 normal workdays at a jobsite location determined by the owner.

B. A manufacturer's qualified representative shall conduct the training session. The training program shall consist of instruction on operation of the assembly, circuit breakers, fused switches, metering, and major components within the assembly.

3.04 INSTALLATION

A. The Contractors shall install all equipment per the manufacturer's instructions, contract drawings and National Electrical Code.

B. The assembly shall be provided with adequate lifting means and shall be capable of being moved into installation position and bolted directly to the floor without the use of floor sills provided the floor is level to 1/8 inch per 3-foot distance in any direction. All necessary hardware to secure the assembly in place shall be provided by the Contractor.

3.05 FIELD ADJUSTMENTS

A. The Contractor shall perform field adjustments of the protective devices as required to place the equipment in final operating condition. The settings shall be in accordance with the approved short-circuit study, protective device evaluation study and protective device coordination study.

B. Necessary field settings of devices and adjustments and minor modifications to equipment to accomplish conformance with an approved short circuit and protective device coordination study shall be carried out by the Contractor at no additional cost to the owner.

SOLANO COMMUNITY COLLEGE DISTRICT

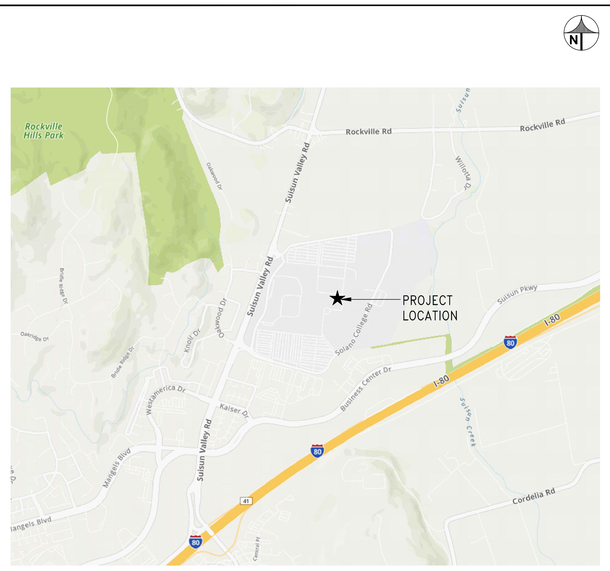
SOLANO COMMUNITY COLLEGE

4000 SUISUN VALLEY RD
FAIRFIELD, CA 94534

SUBSTATION #3 & #4 REPLACEMENT

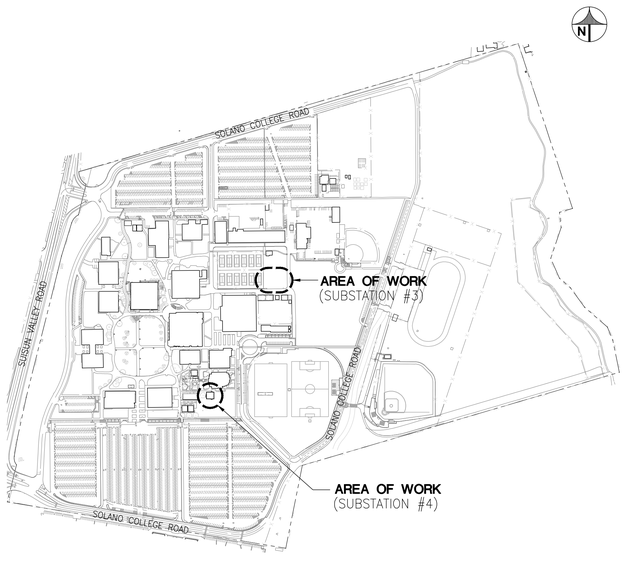
VICINITY MAP

SCALE: N.T.S.



SITE PLAN

SCALE: N.T.S.



APPLICABLE CODES

UNLESS OTHERWISE INDICATED OR SPECIFIED, PERFORM THE WORK IN CONFORMANCE WITH THE LATEST EDITIONS OF ALL APPLICABLE REGULATORY REQUIREMENTS, INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING:

1. CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE (PART 1, TITLE 24): 2019
2. CALIFORNIA BUILDING CODE (PART 2, TITLE 24): 2018 IBC WITH 2019 CA AMENDMENTS
3. CALIFORNIA ELECTRICAL CODE (PART 3, TITLE 24): 2017 NEC WITH 2019 CA AMENDMENTS
4. CALIFORNIA MECHANICAL CODE (PART 4, TITLE 24): 2018 UMC WITH 2019 CA AMENDMENTS
5. CALIFORNIA PLUMBING CODE (PART 5, TITLE 24) 2018 UPC WITH 2019 CA AMENDMENTS
6. CALIFORNIA ENERGY CODE (PART 6, TITLE 24): 2019
7. CALIFORNIA HISTORICAL BUILDING CODE, (PART 8, TITLE 24): 2019
8. CALIFORNIA FIRE CODE (PART 9, TITLE 24): 2018 IFC WITH 2019 CA AMENDMENTS
9. CALIFORNIA EXISTING BUILDING CODE (PART 10, TITLE 24): 2019 (2018 INTERNATIONAL EXISTING BUILDING CODE WITH 2019 CA AMENDMENTS)
10. CALIFORNIA GREEN BUILDING STANDARDS CODE OR CAL GREEN (PART 11, TITLE 24): 2019
11. CALIFORNIA REFERENCED STANDARDS CODE (PART 12, TITLE 24): 2019
12. PUBLIC SAFETY (CCR TITLE 19), STATE FIRE MARSHAL: CURRENT REVISION
13. NFPA 72, NATIONAL FIRE ALARM CODE, 2016 EDITION

PROJECT COORDINATION AND CONSTRUCTION SEQUENCING

1. THE SUBSTATION #3 AND #4 REPLACEMENT PROJECT WILL BE ONGOING DURING A CONCURRENT 'CENTRAL PLANT MODERNIZATION' PROJECT. FIELD VERIFICATION AND PROJECT COORDINATION IS NECESSARY FOR CONSTRUCTION ACTIVITIES, LAY DOWN AREAS, AND ELECTRIC UTILITY ACTIVITIES INVOLVING THE ELECTRICAL INFRASTRUCTURE SERVING THE CENTRAL PLANT FACILITIES AND ADJACENT BUILDINGS AND FACILITIES.
2. CENTRAL PLANT MODERNIZATION PROJECT WILL UTILIZE THE EXISTING SUBSTATION #3 INSIDE THE CHILLER PLANT AND EXISTING CENTRAL PLANT ELECTRICAL EQUIPMENT WILL BE UPGRADED AS NECESSARY TO ACCOMMODATE THE NEW MECHANICAL EQUIPMENT. REFER TO CENTRAL PLANT MODERNIZATION PROJECT ELECTRICAL DRAWINGS, PROVIDED AS REFERENCE WITHIN THIS BID PACKAGE, FOR ADDITIONAL INFORMATION.
3. SUBSTATION #3 AND #4 REPLACEMENT PROJECT WILL BE RESPONSIBLE FOR THE INSTALLATION OF THE NEW SUBSTATION #3, THE DEMOLITION OF THE EXISTING SUBSTATION #3 IN THE CHILLER PLANT, AND THE ELECTRICAL SWITCH OVER OF ALL EQUIPMENT FROM THE EXISTING SUBSTATION #3 TO THE NEW SUBSTATION #3 INSTALLED OUTDOORS

ELECTRICAL SHUTDOWN NOTES

1. INTERRUPTION OF THE ELECTRICAL SERVICE WILL AFFECT BUILDINGS THROUGHOUT CAMPUS. CONTRACTOR SHALL PROVIDE TEMPORARY POWER TO ALL AFFECTED BUILDINGS AND SYSTEMS. CONTRACTOR TO COORDINATE SHUTDOWN AND RECONNECTION WITH THE CAMPUS PRIOR TO BEGINNING WORK. ALL ELECTRICAL CONNECTIONS REQUIRING AN OUTAGE SHALL BE MADE DURING AN APPROVED TIME PERIOD, AT THE CONVENIENCE OF THE COLLEGE. NOTIFY COLLEGE AT LEAST 90 DAYS IN ADVANCE OF ANY POWER SHUT DOWN OF EXISTING PANELS OR SERVICE.
2. ALL <E> PERMANENT GENERATORS SHALL BE TURNED OFF DURING SHUTDOWN AND SHALL BE USED FOR TEMPORARY POWER.
3. PRIOR TO DISCONNECTION OF ELECTRICAL EQUIPMENTS/CABLES. CONTRACTOR SHALL VERIFY OR TEST EQUIPMENT FOR FUNCTIONALITY. NOTIFY ENGINEER OF ABNORMALITIES.
4. TEMPORARY GENERATORS SHALL MEET COUNTY FUEL CONTAINMENT REQUIREMENTS.
5. CONTRACTOR IS RESPONSIBLE FOR REFUELING OF GENERATORS FOR ENTIRE SHUTDOWN DURATION.
6. TWO DAYS BEFORE THE SCHEDULED OUTAGE:
   a. ALL RENTED TEMPORARY GENERATORS, CABLING, CONNECTION, SECONDARY CONTAINMENT, CABLE GUARDS AND RAMPS AND TEMPORARY FENCING ASSOCIATED WITH PORTABLE GENERATORS SHALL BE IN PLACE, FUELED AND TESTED. EQUIPMENT SHALL BE SECURED TO PREVENT THEFT. ALL TEMPORARY FENCING AND SECONDARY CONTAINMENT MUST MEET THE REQUIREMENTS OF THE LOCAL FIRE MARSHAL & HAZARDOUS MATERIALS PERMIT.
   b. TEMPORARY GENERATOR CABLE PATHWAYS SHALL BE INSTALLED, IF REQUIRED.
   c. LOCK–OUT/TAG–OUT DEVICES SHALL BE ON–HAND AND LOCATIONS IDENTIFIED (RETURN TO SERVICE & COORDINATE WITH UNIVERSITY TO RE–START SYSTEMS AFTER OUTAGE).
   d. ALL HAZARDOUS MATERIALS PERMIT FOR ALL GENERATORS SHALL BE PAID AND PROVIDED BY THE CONTRACTOR.
7. CONTRACTOR RESPONSIBLE FOR SUBMITTING AND PAYING ALL AIR QUALITY PERMIT REQUIRED BY AHJ.
8. DMOP REQUIRED FOR ALL CROSS OVER/HOT WORK LOCATIONS AND TO INCLUDE BACKOUT PROCEDURES. DMOP TO BE SUBMITTED TWO MONTHS PRIOR TO PLANNED OUTAGE FOR REVIEW AND APPROVAL.
9. CONTRACTOR TO PROVIDE SUBMITTAL ON GENERATOR CONNECTION PLAN INCLUDING GENERATOR: SIZE, LOCATION, SPILL CONTAINMENT, AND CABLE MANAGEMENT.

DESIGN BUILD REQUIREMENTS

1. IN ADDITION TO SPECIFIED DESIGN BUILD PROJECT REQUIREMENTS, CONTRACTOR SHALL BE REQUIRED TO PROVIDE ENGINEERING, STRUCTURAL AND ARCHITECTURAL DESIGN DRAWINGS, SHOP DRAWINGS, CONSTRUCTION DRAWINGS, DETAIL DRAWINGS, CALCULATIONS, AND PRODUCT SUBMITTALS TO COLLEGE FOR REVIEW AND APPROVAL. ALL DOCUMENTS SUBMITTED FOR APPROVAL MUST BE PREPARED BY QUALIFIED PROFESSIONALS IN ACCORDANCE WITH CALIFORNIA STATE LAW. NO ITEMS SHALL BE INSTALLED WITHOUT WRITTEN COLLEGE APPROVAL. EACH DRAWING SHALL BE SIGNED, SEALED AND DATED BY CALIFORNIA LICENSED PROFESSIONAL(S) RESPONSIBLE FOR DESIGN. ALL SUCH PROFESSIONAL SERVICES SHALL MEET OR EXCEED PROFESSIONAL STANDARD AND QUALITY WHICH PREVAIL AMONG LICENSED PROFESSIONALS OF SIMILAR KNOWLEDGE AND SKILL ENGAGED IN RELATED WORK THROUGHOUT CALIFORNIA UNDER SAME OR SIMILAR CIRCUMSTANCES.
2. CONTRACTOR SHALL BE REQUIRED TO DESIGN AND BUILD THIS PROJECT. THESE CONTRACT DOCUMENTS ARE INTENDED TO SET FORTH MAJOR ELEMENTS/REQUIREMENTS OF DESIGN/BUILD PROGRAM CRITERIA. REQUIREMENTS DESCRIBED WITHIN THESE CONTRACT DOCUMENTS SHALL BE INCORPORATED INTO DESIGN. HOWEVER, NOT ALL DESIGN ELEMENTS, ISSUES, OR SPECIFIC DETAILS HAVE BEEN INCLUDED. DESIGN ELEMENTS, ISSUES, OR SPECIFIC DETAILS THAT ARE NOT SPECIFICALLY NOTED, BUT THAT ARE DEEMED NECESSARY BY COLLEGE FOR SUCCESSFUL COMPLETION OF THIS PROJECT SHALL BE DESIGN/BUILD RESPONSIBILITY OF CONTRACTOR. CONTRACTOR SHALL BE RESPONSIBLE TO INCLUDE AND VALIDATE ALL SUCH ELEMENTS WITH COLLEGE. ELECTRONIC CAD FILES FOR DRAWINGS AND SPECIFICATIONS ARE AVAILABLE UPON REQUEST FROM COLLEGE.
3. CONTRACTOR'S PROPOSED DESIGN IS REQUIRED TO MEET ALL REQUIREMENTS OF COLLEGE AND BE APPROVED BY COLLEGE. COMPLETION OF DESIGN IS RESPONSIBILITY OF CONTRACTOR AND SHALL INCLUDE ALL WORK NECESSARY TO PRODUCE FULLY–FUNCTIONAL, CODE COMPLIANT SITE AND STRUCTURE, TO SATISFACTION OF COLLEGE. FULL DESIGN RESPONSIBILITY SHALL ALSO INCLUDE, BUT NOT LIMITED TO, CONDUCTING DESIGN INQUIRIES, GATHERING PROGRAMMING DESIGN DATA, SITE VERIFICATION OF FIELD CONDITIONS, DESIGN FEASIBILITY, DESIGN ALTERNATIVES, AND PRODUCTION OF FINAL CONSTRUCTION DOCUMENTS. CONTRACTOR SHALL COMPLY WITH ALL COLLEGE REQUIREMENTS EITHER AS RESULT OF COMMENTS MADE DURING REVIEW/APPROVAL PROCESS OR DURING FINAL INSPECTION OF PROJECT.
4. THESE CONTRACT DOCUMENTS ARE INTENDED ONLY TO GENERALLY DESCRIBE MINIMUM WORK, LEVEL OF QUALITY EXPECTED, AND TYPES OF EQUIPMENT TO BE UTILIZED. ACCOMPANYING REFERENCE DRAWINGS ARE INCLUDED FOR CONTRACTOR'S USE TO AID IN PRODUCING BID PROPOSAL AS WELL AS COMPLETE DESIGN/BUILD ENGINEERING DOCUMENTS AS REQUIRED. REFERENCE DRAWING PACKAGE GENERALLY SHOWS WORK TO BE CONSTRUCTED. ACCURACY OF DRAWINGS OR THEIR CONTENTS IS NOT GUARANTEED TO REFLECT ACTUAL SITE/INSTALLATION CONDITIONS AND IS SUBJECT TO CONTRACTOR FIELD VERIFICATION.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FIELD WORK, FIELD SURVEYS, AND SITE VISITS TO DOCUMENT, CONFIRM, AND VERIFY EXISTING CONDITIONS, AND MAKE REVISIONS/MODIFICATIONS TO ACCURATELY REFLECT ACTUAL SITE CONDITIONS, AND OBTAIN ALL NECESSARY DESIGN INFORMATION REQUIRED FOR SUCCESSFUL PROJECT COMPLETION. SUCH MODIFICATIONS SHALL INCLUDE, BUT ARE NOT LIMITED TO, DRAWING SCALE, DIMENSIONS, UTILITY BOXES, SURFACE CONDITIONS, AND OTHER PERTINENT DESIGN RELATIONSHIPS. CONTRACTOR SHALL NOT PROCEED WITH ANY CONSTRUCTION UNTIL COLLEGE APPROVES FINAL DESIGN DOCUMENTS IN WRITING.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AND OBTAINING ALL FINALIZED DESIGN CRITERIA FROM COLLEGE PRIOR TO OR PROGRESSIVELY DURING DESIGN ENGINEERING PROCESS. FINAL DESIGN SHALL MEET ALL COLLEGE CRITERIA FOR SPECIFIC PRODUCTS/EQUIPMENT, INSTALLATION METHODS, DESIGN LAYOUTS, CONSTRUCTION IMPLEMENTATION, WORKMANSHIP, BUDGET, CODE COMPLIANCE, DOCUMENTATION, OPERATION, AND MAINTENANCE.
7. ALL EQUIPMENT AND MATERIALS SHALL BE NEW, UL LISTED AND APPROVED FOR APPLICATION INTENDED.
8. CONTRACTOR SHALL BE FULLY RESPONSIBLE AND LIABLE FOR ADEQUACY OF SYSTEMS/EQUIPMENT DESIGN AND INSTALLATION REQUIRED BY THIS PROJECT. CONTRACTOR SHALL INDEMNIFY, DEFEND AND HOLD COLLEGE HARMLESS FROM ANY CLAIM, DAMAGES, LOSS OR EXPENSE ARISING OUT OF OR RESULTING FROM CONTRACTOR'S DESIGN WORK PRODUCT OR CONTRACTOR'S FAILURE TO DESIGN SYSTEM IN ACCORDANCE WITH THIS ATTACHMENT AND THESE CONTRACT DOCUMENTS.
9. CONTRACTOR REPRESENTS AND WARRANTS THAT ALL DRAWINGS, SPECIFICATIONS, AND OTHER DESIGN WORK PRODUCTS ARE PROPERTY OF COLLEGE WITHOUT RESTRICTIONS OR LIMITATION UPON USE.
10. DESIGN –BUILD EFFORT SHALL PROVIDE CONTINUOUS POWER TO ALL AREAS OF CAMPUS DURING CONSTRUCTION. PROVIDE MEANS AND METHODS TO ACCOMPLISH, SUCH AS APPROPRIATE PHASING, TEMPORARY POWER (GENERATORS) ETC.

DRAWING INDEX

SHEET NO.	DESCRIPTION
E–0.0	COVER SHEET
E–0.1	ELECTRICAL GENERAL NOTES, SYMBOLS & ABBREVIATIONS
E–1.0	ELECTRICAL OVERALL SITE PLAN
E–1.1	ELECTRICAL PARTIAL SITE PLAN (SUBSTATION #3)
E–1.2	ELECTRICAL PARTIAL SITE PLAN (SUBSTATION #3 – OPTION 2)
E–4.1	ELECTRICAL SUBSTATION #3 PLAN
E–4.2	ELECTRICAL CENTRAL PLANT FLOOR PLAN
ED–4.3.1	ELECTRICAL SUBSTATION #4 PLAN – DEMO
E–4.3.1	ELECTRICAL SUBSTATION #4 PLAN – NEW
ED–4.3.2	ELECTRICAL SUBSTATION #4 PLAN (OPTION 2) – DEMO
E–4.3.2	ELECTRICAL SUBSTATION #4 PLAN (OPTION 2) – NEW
ED–7.1	ELECTRICAL SINGLE LINE DIAGRAM – DEMO
E–7.1	ELECTRICAL SINGLE LINE DIAGRAM – NEW
ED–7.2	ELECTRICAL SINGLE LINE DIAGRAM – DEMO (SUBSTATION #3 – OPTION 2)
E–7.2	ELECTRICAL SINGLE LINE DIAGRAM – NEW (SUBSTATION #3 – OPTION 2)

SUMMARY OF WORK

THE DESIGN BUILD CONTRACTOR SHALL PREPARE PLANS, SPECIFICATION, AND ALL CALCULATION REQUIRED TO OBTAIN AHJ APPROVAL TO CONSTRUCT TWO NEW SUBSTATIONS. WORK SHALL INCLUDE:

1. PROVIDE AND INSTALL NEW SUBSTATION #3 (SUBSTATIONS #3.1 & #3.2) AND SUBSTATION #4.
2. REMOVE EXISTING SUBSTATIONS #3 AND #4.
3. REMOVE EXISTING LV SWITCHBOARDS AND FEEDERS WHERE IDENTIFIED.
4. PROVIDE AND INSTALL LV SWITCHBOARDS AND FEEDERS WHERE IDENTIFIED.
5. PROVIDE AND INSTALL NEW UNDERGROUND ELECTRICAL VAULTS AND PULL BOXES WHERE IDENTIFIED.
6. PROVIDE AND INSTALL NEW MV DISCONNECT SWITCH WHERE IDENTIFIED.
7. RE–FEED ALL LOADS AFFECTED BY WORK.

TWO DESIGN OPTIONS PROVIDED FOR BOTH SUBSTATIONS #3 AND #4. CONTRACTOR TO DESIGN AND PROVIDE SYSTEM MEETING EITHER OPTIONS OR COMBINATION THERE OF.

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SOLANO COMMUNITY COLLEGE DISTRICT

SOLANO COMMUNITY COLLEGE

4000 SUISUN VALLEY RD
FAIRFIELD, CA 94534

SUBSTATION #3 & #4 REPLACEMENT

DSA APPL #XX-XXXXXX

ISSUE		
MARK	DATE	DESCRIPTION
	08/16/22	D&B BRIDGING DRAWING SET

SOBE PROJECT NO:	2200690
DATE:	08/15/22
DRAWN BY:	
CHECKED BY:	MM
APPROVED BY:	HK

SHEET TITLE

COVER SHEET

SCALE: AS NOTED
THIS DRAWING IS 30" X 42" AT FULL SIZE

E-0.0

SHEET OF XX

DEMOLITION NOTES

1. REMOVE EXISTING EQUIPMENT IN CONFLICT WITH NEW CONDITIONS. REMOVE ALL WIRE NOT IN SERVICE AND FROM ABANDONED RACEWAYS. PROTECT EXISTING CIRCUITING PASSING THROUGH DEMOLITION AREAS. EXTEND AND/OR RELOCATE AS NECESSARY.
2. ALL ABANDONED EQUIPMENT INCLUDING LIGHT, RECEPTACLES, DATA, FIRE ALARM, ETC., SHALL BE COVERED WITH BLANK METAL PLATES AND PAINTED TO MATCH THE ADJACENT FINISH OF SURROUNDING WALLS OR CEILING TO THE SATISFACTION OF THE ARCHITECT/OWNER.
3. ELECTRICAL CONTRACTOR IS RESPONSIBLE TO DISCONNECT AND REMOVE ALL EXISTING ELECTRICAL EQUIPMENT AFFECTED BY THE PROJECT. THIS INCLUDES REROUTING OR THE EXTENSION OF EXISTING CONDUIT AND FEEDER WHERE NECESSARY TO MAINTAIN OPERATIONAL OF ANY EXISTING EQUIPMENT.
4. CIRCUIT NUMBERS AND CONDUIT HOMERUNS SHOWN ON THESE DRAWINGS WERE TAKEN FROM EXISTING RECORD DRAWINGS. ELECTRICAL CONTRACTOR IS RESPONSIBLE TO VERIFY EXISTING CIRCUITING AND CONDUIT HOMERUNS. ADJUST CIRCUIT NUMBERS ACCORDING TO THE ACTUAL CONDITIONS.
5. WHERE EXISTING CONDUIT IS TO BE ABANDONED OR DEMOLISHED, THE CONDUIT SHALL BE REMOVED IF IT IS EXPOSED, IN A CRAWL SPACE OR IN AN ACCESSIBLE CEILING. ABANDONED OR DEMOLISHED CONDUIT FEEDS UP THROUGH THE FLOOR SHALL BE CUT OFF AND PLUGGED FLUSH WITH THE FLOOR.
6. ALL ELECTRICAL EQUIPMENT INCLUDING LIGHT, RECEPTACLE, DATA, FIRE ALARM, ETC., THAT ARE TO BE REMOVED, SHALL BE REMOVED COMPLETELY, INCLUDING CONDUIT AND WIRING BACK TO THE LAST DEVICE REMAINING IN SERVICE, OR SOURCE.
7. EXISTING CIRCUITS WHICH ARE REMOVED AND NOT REUSED SHALL BE IDENTIFIED ON THE PANEL SCHEDULE AS "SPARE".
8. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE OWNER PRIOR TO REMOVAL OF EXISTING ELECTRICAL EQUIPMENT AND TURN OVER REMOVED EQUIPMENT THAT THE OWNER REQUESTS IN AN "AS–FOUND" CONDITION.
9. ALL DEMOLITION WORK SHOWN, IF ANY, WAS PREPARED FOR THE CONVENIENCE OF THE CONTRACTOR. NO REPRESENTATION HAS BEEN MADE THAT ALL ITEMS THAT MAY REQUIRE DEMOLITION HAVE BEEN SHOWN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CAREFULLY EXAMINE THE SITE AND THE CONTRACT DOCUMENTS AND TO PERFORM ALL DEMOLITION AND RECONSTRUCTION WHICH MAY BE REQUIRED FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK.
10. WHEN CALLED FOR, OR SCOPE OF WORK REQUIRES ELECTRICAL EQUIPMENT TO BE REMOVED, ALL CONDUIT, WIRE, BOXES, HANGERS, ETC. SHALL BE REMOVED COMPLETELY. ALL OPENINGS SHALL BE PATCHED, SEALED AND PAINTED TO MATCH THE ADJACENT FINISH.

LOAD CALCULATIONS

ELECTRICAL LOAD CALCULATIONS - NEW SUBSTATION #3 (SUB'S 3.1 & 3.2)

	HP/UNIT	KVA/UNIT	QTY	SUB #3 SUB-TOTAL LOAD (KVA)	KVA/UNIT	SUB #3.1 SUB-TOTAL LOAD (KVA)	KVA/UNIT	SUB #3.2 SUB-TOTAL LOAD (KVA)
LIGHTING (CP):								
3,830 SF @ 2VA/SF		8						
LTG LOAD @ 125%		10	1	10		10		0
GENERAL RECEPTACLES (CP):								
3,830 SF @ 1VA/SF		4						
1ST 10KVA @ 100%		4	1	4		4		0
MECHANICAL EQUIPMENT (CP):								
NON-COINCIDENT LOADS:								
LOAD SET 'A':								
(LARGEST COINCIDENT-LOAD SET - WINTER)								
<N> ELECTRIC BOILER-1		840			840		0	
<N> ELECTRIC BOILER-2		840			0		840	
<N> ELECTRIC BOILER-3		840			840		0	
<F> ELECTRIC BOILER-4		800			0		800	
<E> GAS BOILER-1 (2HP) - FED BY <E> PNL 'CP-M'	2	3			0		3	
<E> GAS BOILER-2 (2HP) - FED BY <E> PNL 'CP-M'	2	3			0		3	
<E> GAS BOILER-3 (2HP) - FED BY <E> PNL 'CP-M'	2	3			0		3	
<E> HHWP-1 (30HP) - FED BY <E> PNL 'CP-M'	30	33			0		33	
<E> HHWP-2 (30HP) - FED BY <E> PNL 'CP-M'	30	33			0		33	
<E> CH-3:								
- 236HP - 349A MCA	236	237			0		237	
- 285A FLC @ 480V - NEC TABLE								
<E> CHWP-3 (50HP) - FED BY <E> PNL 'CP-M'	50	54			0		54	
<E> CWP-3 (30HP) - FED BY <E> PNL 'CT-M'	30	33			33		0	
<E> CT-1 (50HP FAN) - FED BY <E> PNL 'CT-M'	50	54			54		0	
<E> EF-1 (3/4HP) - FED BY <E> PNL 'CP-M'	0.75	1			0		1	
<E> EF-2 (3HP) - FED BY <E> PNL 'CP-M'	3	4			0		4	
LOAD SET 'A' TOTAL:		**3,778**			**1,767**		**2,011**	
LOAD SET 'B':								
(LOADS NOT USED SIMULTANEOUSLY WITH LOAD SET 'A' - REMOVED FROM CALCULATIONS)								
<E> CH-1:								
- 370HP - 475A MCA	370	397			397		0	
- 477A FLC @ 480V - NEC TABLE								
<E> CH-2:								
- 370HP - 475A MCA	370	397			0		397	
- 477A FLC @ 480V - NEC TABLE								
<E> CHWP-1 (100HP) - FED BY <E> PNL 'CP-M'	100	103			0		103	
<E> CHWP-2 (100HP) - FED BY <E> PNL 'CP-M'	100	103			0		103	
<E> HHWP-3 (30HP) - FED BY <E> PNL 'CP-M'	30	33			0		33	
<E> CT-2 (50HP FAN) - FED BY <E> PNL 'CT-M'	50	54			54		0	
<E> CS-1 (15HP PUMP) - FED BY <E> PNL 'CT-M'	15	17			17		0	
<E> CWP-1 (60HP) - FED BY <E> PNL 'CT-M'	60	64			64		0	
<E> CWP-2 (60HP) - FED BY <E> PNL 'CT-M'	60	64			64		0	
LOAD SET 'B' TOTAL:		**1,232**	0	0	**596**		**636**	
LARGEST COINCIDENT-LOAD SET:								
LOAD SET 'A'		**3,778**	1	3,778		**1,767**		**2,011**
OTHER LOADS:								
<E> BUILDING 1700A (600A MCB - 480V @ 60%)		299	1	299		299		0
<E> TENNIS COURT (100A MCB - 480V @ 60%)		50	1	50		0		50
<E> POOL EQ (200A MCB - 480V @ 60%)		100	1	100		0		100
<E> SID (2x30HP - 480V)	30	33	2	67		67		0
<E> CHWP-1700A (10HP - 480V) - FED BY <E> PNL 'CP-M'	10	12	1	12		0		12
LARGEST MOTOR @ 25%:								
<E> CH-3 (236HP) @ 25%		59	1	59				59
<E> CT-1 (50HP FAN) - FED BY <E> PNL 'CT-M' @ 25%		14	0	0		14		

	SUB #3 (SUB'S 3.1 & 3.2)		SUB #3.1		SUB #3.2
TOTAL DEMAND LOAD (KVA) =	**4,378**		**2,160**		**2,231**
DEMAND LOAD AMPS @ 12.47KV - 3PH =	**203**		**100**		**103**
DEMAND LOAD AMPS @ 480V - 3PH =	**5,266**		**2,598**		**2,684**
SYSTEM CAPACITY (A) @ 480V - 3PH =	**8,000**		**4,000**		**4,000**
REMAINING CAPACITY (A) @ 480V - 3PH =	**2734 (34%)**		**1402 (35%)**		**1316 (33%)**
TOTAL TRANSFORMER SIZE (KVA) =	**5000 + 25% (6250)**		**2500 + 25% (3125)**		**2500 + 25% (3125)**
SYSTEM CAPACITY (KVA) =	**6,250**		**3,125**		**3,125**
REMAINING CAPACITY (KVA) =	**1872 (30%)**		**965 (31%)**		**894 (29%)**

NOTE:
1. LOAD CALCULATIONS PROVIDED FOR DESIGN INTENT. CONTRACTOR RESPONSIBLE FOR PROVIDING THEIR OWN CALCULATIONS AND CONFIRMING ALL EQUIPMENT AND FEEDER SIZES.

GENERAL NOTES

1. CONTRACTOR IS RESPONSIBLE TO OBTAIN A COMPLETE SET OF CONTRACT DOCUMENTS, ADDENDA, DRAWINGS, AND SPECIFICATIONS. PRIOR TO SUBMITTING PROPOSAL, CONTRACTOR SHALL EXAMINE ARCHITECTURAL, STRUCTURAL AND MECHANICAL CONSTRUCTION DRAWINGS AND SPECIFICATIONS AND SHALL HAVE VISITED THE CONSTRUCTION SITE. HE/SHE SHALL BE FAMILIAR WITH THE EXISTING CONDITIONS UNDER WHICH HE/SHE WILL HAVE TO OPERATE AND WHICH WILL IN ANY WAY AFFECT THE WORK UNDER THIS CONTRACT. NO SUBSEQUENT ALLOWANCE WILL BE MADE IN THIS CONNECTION IN BEHALF OF THE CONTRACTOR FOR ANY ERROR OR NEGLIGENCE ON HIS/HER PART. DETERMINE THE SEQUENCE OF CONSTRUCTION THROUGHOUT THE PROJECT, INCLUDING TEMPORARY FACILITIES AND CONNECTIONS REQUIRED FOR THE DURATION OF THE PROJECT.
2. ALL TEMPORARY CONNECTIONS SHALL BE CONSIDERED PART OF THIS CONTRACT AND NO EXTRA CHARGES WILL BE ALLOWED. THIS SHALL INCLUDE MINOR ITEMS OF MATERIAL OR EQUIPMENT NECESSARY TO MEET THE REQUIREMENTS AND INTENT OF THE PROJECT.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF PERSONS AND PROPERTY AND SHALL PROVIDE INSURANCE COVERAGE AS NECESSARY FOR LIABILITY, PERSONAL, AND PROPERTY DAMAGE, TO FULLY PROTECT THE OWNER, ARCHITECT, AND ENGINEER FROM ANY AND ALL CLAIMS RESULTING FROM THIS WORK.
4. THE CONTRACTOR SHALL PROVIDE TO THE ARCHITECT A CONSTRUCTION SCHEDULE OF ALL ELECTRICAL WORK. THE CONSTRUCTION SCHEDULE SHALL IDENTIFY ALL SIGNIFICANT MILESTONES WITH COMPLETION DATES.
5. THE CONTRACTOR SHALL MAINTAIN RECORD DRAWINGS AT THE PROJECT SITE INDICATING ALL MODIFICATIONS TO ELECTRICAL SYSTEMS. THE CONTRACTOR SHALL, AT THE CONCLUSION OF THE PROJECT, PROVIDE A SET OF REPRODUCIBLE (AUTOCAD), ACCURATE AND NEAT "AS–BUILT" DRAWINGS ACCEPTABLE TO THE ARCHITECT.
6. THESE DRAWINGS DO NOT REPRESENT THE EXACT LOCATIONS, SIZES OR EXTENT OF UTILITIES ON SITE. CONTRACTOR SHALL TAKE STANDARD PRECAUTIONS FOR WORK IN EXISTING FACILITIES.
7. EXISTING ELECTRICAL WIRING WHICH WILL NOT BE MADE OBSOLETE AND WHICH WILL BE DISTURBED DUE TO CONSTRUCTION CHANGES REQUIRED BY THIS CONTRACT SHALL BE RESTORED TO OPERATING CONDITION, AS REQUIRED AND/OR DIRECTED. WHERE REQUIRED, SHOWN AND/OR DIRECTED, OUTLETS AND CONDUIT RUNS SHALL BE RELOCATED. IN SOME CASES IT MAY BE NECESSARY TO EXTEND CONDUITS AND PULL IN NEW WIRING OR INSTALL JUNCTION BOXES AND SPLICE IN NEW WIRING OR REPLACE OLD WIRING WITH NEW.
8. CERTAIN REMODELING OF ELECTRICAL FACILITIES WILL BE REQUIRED IN THE EXISTING BUILDING. EXISTING CONDUIT RUNS ARE GENERALLY NOT SHOWN, ALTHOUGH A FULL ATTEMPT HAS BEEN MADE TO SHOW SOME EXISTING CONDITIONS, OF WHICH INFORMATION HAS BEEN TAKEN FROM EXISTING RECORD DRAWINGS AND/OR LIMITED FIELD INVESTIGATIONS. THE DRAWINGS SHOWING LOCATION OF EXISTING EQUIPMENT, OUTLETS, FIXTURES, ETC., ARE APPROXIMATE ONLY (CONTRACTOR TO FIELD VERIFY).
9. ALL ELECTRICAL MATERIALS AND EQUIPMENT SHALL BE NEW AND SHALL BE LISTED AND LABELED BY A NATIONALLY RECOGNIZED TESTING LABORATORY AND SHALL BE INSTALLED AS PER LISTING OR LABELING (IE. MAXIMUM FUSE SIZE MEANS FUSE PROTECTION IS REQUIRED).
10. ALL ELECTRICAL EQUIPMENT AND INSTALLATION SHALL COMPLY WITH THE FOLLOWING REQUIREMENTS:
    a. AMERICAN STANDARD ASSOCIATION (ASA)
    b. AMERICAN NATIONAL STANDARD INSTITUTE (ANSI)
    c. AMERICAN SOCIETY OF TESTING MATERIALS (ASTM)
    d. CALIFORNIA CODE OF REGULATIONS TITLE 24 (CCR)
    e. INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS (IEEE)
    f. INSULATED POWER CABLE ENGINEERS ASSOCIATIONS (IPCEA)
    g. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATIONS (NEMA)
    h. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
    i. ALL LOCAL CODE HAVING JURISDICTION
11. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS, FEES, INSPECTIONS AND INCIDENTAL COSTS NECESSARY FOR EXECUTION AND COMPLETION OF ELECTRICAL WORK, INCLUDING ALL CHARGES BY STATE, COUNTY AND LOCAL GOVERNMENTAL AGENCIES. CONTRACTOR SHALL BE RESPONSIBLE FOR THE ELECTRICAL UTILITY SYSTEM SHUT–DOWNS AND START–UP. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION REQUIRED WITH OTHER AGENCIES AND UTILITY COMPANIES.
12. CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL CROSSINGS ON NEW UTILITIES WITH THAT OF EXISTING ON SITE AND IN ADJACENT PROPERTIES. NOTIFY THE ENGINEER IMMEDIATELY OF ANY DEVIATIONS OR DISCREPANCIES FROM THIS PLAN.
13. CONTRACTOR SHALL COORDINATE HIS/HER WORK WITH OTHER TRADE ON SITE. ANY COST TO PERFORM WORK TO ACCOMPLISH SAID COORDINATION WHICH DIFFERS FROM THE WORK AS SHOWN ON THE DRAWINGS SHALL BE INCURRED BY THE CONTRACTOR. ANY DISCREPANCIES, AMBIGUITIES OR CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT DURING BID TIME FOR CLARIFICATIONS. ANY SUCH CONFLICTS NOT CLARIFIED PRIOR TO BID SHALL BE SUBJECT TO THE INTERPRETATION OF THE ARCHITECT/ENGINEER AT NO ADDITIONAL COST TO THE OWNER.
14. COORDINATE WITH OTHER TRADES AS TO THE EXACT LOCATION OF THEIR RESPECTIVE EQUIPMENT. PROVIDE POWER AND CONNECTION TO MOTORS AND EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS AS INDICATED ON ELECTRICAL DRAWINGS AND DRAWINGS OF OTHER TRADES. CONTRACTOR SHALL REVIEW DRAWINGS OF OTHER TRADES FOR CONTROL DIAGRAMS, SIZE AND LOCATION OF EQUIPMENT. DISCONNECT SWITCHES, STARTERS, AND CONDUITS FOR CONTROL WIRING FOR MECHANICAL AND PLUMBING EQUIPMENT SHALL BE PROVIDED BY ELECTRICAL CONTRACTOR. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING MANUFACTURER'S SHOP DRAWINGS PRIOR TO ROUGHING IN ALL CONDUITS TO THIS EQUIPMENT.
15. BEFORE ROUGH–IN, VERIFY ALL MOUNTING HEIGHTS AND EXACT LOCATIONS FOR ALL EQUIPMENT, ELECTRICAL CONNECTIONS, STUB–UPS, RECEPTACLES, OUTLETS, CONDUIT RUNS, ETC. WITH ARCHITECT AND OWNER. PLACE DEVICES LOCATED ABOVE COUNTERS, SHELVING, ETC. AND IN BATHROOMS SO AS NOT TO CONFLICT WITH EDGES OF WAINSCOTING, COUNTER SPLASH, SHELVING, ETC. ARCHITECTURAL DRAWINGS SHALL GOVERN. REFER TO ARCHITECTURAL ELEVATIONS FOR EXACT LOCATIONS OF ELECTRICAL DEVICES
16. MOUNTING HEIGHTS OF ALL CONTROL DEVICES TO BE USED BY OCCUPANT OF THE ROOM OR AREA SHALL BE MOUNTED AT THE FOLLOWING HEIGHTS:
    RECEPTACLES OUTLETS : +18" (TO BOTTOM OF OUTLETS)
    TELEPHONE/TV/DATA OUTLETS : +18" (TO BOTTOM OF OUTLETS)
    LIGHT SWITCHES : +44" (TO HIGHEST OPERABLE PART)
    OUTLETS ABOVE COUNTER : +44" (TO HIGHEST OPERABLE PART)
    MOUNTING HEIGHTS OF ALL DEVICES AND EQUIPMENT ARE FROM FINISHED FLOOR TO LOCATION OF DEVICE AS NOTED. EQUIPMENT INSTALLED IN LOCATIONS NOT APPROVED BY THE ARCHITECT SHALL BE RELOCATED AS DIRECTED BY THE ARCHITECT AT NO ADDITIONAL COST TO THE OWNER.
17. COORDINATE ALL OUTLET BOX INSTALLATION WITH ARCHITECTURAL WALL FINISH SCHEDULES. SPACE BETWEEN FACEPLATE AND DEVICE BOX SHALL NOT EXCEED 1/8".
18. FOR RENOVATION WORK, THE CONTRACTOR SHALL CONCEAL ALL WORK WHERE POSSIBLE. ALL EXPOSED RACEWAY AND BOXES IN OCCUPIED AREAS OR ON EXTERIOR WALLS SHALL BE PAINTED TO MATCH ADJACENT FINISHES.
19. THE CONTRACTOR SHALL BE HELD FULLY RESPONSIBLE FOR THE PROPER RESTORATION OF ALL EXISTING SURFACES REQUIRING PATCHING, PLASTERING, PAINTING AND/OR OTHER REPAIR DUE TO THE INSTALLATION OF ELECTRICAL WORK UNDER THE TERMS OF THIS SPECIFICATION. CLOSE ALL OPENINGS, REPAIR ALL SURFACES, ETC., AS REQUIRED.
20. SEAL ALL CONDUIT PENETRATIONS THROUGH FIRE RATED WALLS AND CEILINGS. FURNISH AND INSTALL FIRE RATED BACKBOXES AS REQUIRED, MAINTAINING FIRE RATING OF CEILING OR WALLS WHERE RECESSED ELECTRIC EQUIPMENT SUCH AS LIGHT FIXTURES, SWITCHES, RECEPTACLES, PANEL, ETC. ARE INSTALLED IN RATED WALL OR CEILINGS. PENETRATIONS OF FIRE RATED WALLS, CEILINGS, OR FLOORS SHALL COMPLY WITH CBC CHAPTER 7 (714) REQUIREMENTS. CONDUIT PENETRATIONS THAT ARE NOT STUBBED–OUT INSIDE THE WALL SHALL MEET F AND T RATING. ALL FIRE PROOFING METHODS SHALL BE UL APPROVED.
21. ALL EXTERIOR EQUIPMENT SHALL BE NEMA 3R RATED. ALL WALL PENETRATIONS TO EXTERIOR WALLS SHALL BE SEALED WATER TIGHT.
22. PULLING TAPES: ALL RACEWAY WITHOUT CABLE OR WIRE SHALL BE INSTALLED WITH A MINIMUM 1100 LBS. STRENGTH TEST POLYESTER PULLING TAPE. PULLING TAPES SHALL BE DETECTABLE MULE–TAPE WITH SEQUENTIAL FOOTAGE MARKING.
23. RUN NO MORE THAN 3 CURRENT CARRYING CONDUCTORS IN ANY WIREWAY UNLESS DE–RATING IS APPROVED BY ENGINEER OR SHOWN ON DRAWINGS.
24. ALL BRANCH CIRCUIT CONDUCTORS SHALL BE COPPER, #10 AWG MINIMUM, RATED FOR 600V, THHN/THWN, 75 DEGREE CELSIUS. ALL CONDUCTORS SHALL BE STRANDED, SOFT DRAWN ANNEALED COPPER WIRE 98% CONDUCTIVITY, BEARING THE UL LABEL. SYSTEM VOLTAGE SHALL BE IDENTIFIED AS TO VOLTAGE AND PHASE CONNECTIONS BY MEANS OF COLOR IMPREGNATED INSULATION OR APPROVED COLORED MARKING TAPE.
25. WHERE MULTI–HOMERUNS ARE INDICATED ON DRAWINGS INDICATING THE SAME CIRCUIT NUMBER, PROVIDE A JUNCTION BOX ABOVE THE ACCESSIBLE CEILING AND ROUTE ONE SET OF WIRES TO THE CIRCUIT BREAKER.
26. REFER TO THE SINGLE LINE DIAGRAM FOR THE CONDUIT AND CONDUCTOR SIZES HOMERUN TO ELECTRICAL PANELS. CONDUIT RUNS MAY NOT BE SHOWN ON DRAWINGS, BUT ARE PART OF THIS CONTRACT.
27. ALL CONDUIT RUNS INCLUDING STRAIGHT FEEDER AND BRANCH CIRCUIT SHALL BE PROVIDED WITH SUFFICIENT PULL BOXES OR JUNCTION BOXES TO LIMIT THE MAXIMUM LENGTH OF ANY SINGLE CABLE PULL TO 100 FEET. PULL BOXES SHALL BE SIZED PER CODE OR AS INDICATED ON DRAWINGS. LOCATIONS SHALL BE DETERMINED IN THE FIELD OR AS INDICATED ON THE DRAWINGS.
28. FINAL CONNECTIONS TO ALL EQUIPMENT SHALL BE PER MANUFACTURER'S APPROVED WIRING DIAGRAMS, DETAILS, AND INSTRUCTIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE MATERIAL AND EQUIPMENT COMPATIBLE WITH EQUIPMENT ACTUALLY SUPPLIED.
29. DO NOT COMBINE DIFFERENT SYSTEM VOLTAGES IN SAME CONDUIT (EG., 120/208V VS. 277/480V), UNLESS APPROVED BY ENGINEER OR SHOWN ON DRAWINGS.
30. ELECTRICAL SYSTEMS SHALL BE INSTALLED FOR FINAL INSPECTIONS. PROVIDE NEUTRAL TEST AND PROOF OF TORQUE DURING FINAL INSPECTION FOR ALL UNITS. FINAL TERMINATIONS OF CONDUCTORS TO ELECTRICAL EQUIPMENT AND DEVICES SHALL BE TORQUE WRENCH TIGHTENED TO THE MANUFACTURER'S RECOMMENDED SPECIFICATION, NO EXCEPTION.
31. CIRCUIT BREAKER TERMINALS IN SWITCHBOARDS AND LOAD CENTER SHALL BE UL LISTED AND APPROVED FOR USE WITH COPPER 75 DEGREE CELSIUS CONDUCTORS.
32. SIZES OF BREAKERS, SWITCHES, FUSES AND FEEDERS ARE BASED ON DESIGNED EQUIPMENT SIZES. THESE SIZES SHALL BE ADJUSTED TO SATISFY REQUIREMENTS OF ACTUAL INSTALLED OR SUBSTITUTE EQUIPMENT. UP SIZING OR DOWNSIZING OF FEEDERS SHALL BE PROVIDED WITHOUT ADDITIONAL COST TO THE OWNER.
33. AS REQUIRED ALL OVERSIZED FEEDERS THAT WERE ADJUSTED IN SIZE TO COMPENSATE FOR VOLTAGE DROP SHALL BE PROVIDED WITH ADAPTER LUGS OR SPLICE BOX. ADAPTER LUGS SHALL BE PROVIDED IF SIZE IS AVAILABLE. OTHERWISE PROVIDE CABLE SPLICES IN THE SPLICE BOX TO REDUCE CABLES TO THE MAXIMUM SIZE THAT THE BREAKER LUGS CAN ACCOMMODATE.
34. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAW–CUTTING, TRENCHING, BACKFILLING, COMPACTION AND PATCHING OF CONCRETE AND ASPHALT AS REQUIRED TO COMPLETE WORK. USE EXTREME CAUTION WHEN TRENCHING NEAR EXISTING UNDERGROUND UTILITY LINES. CONTRACTOR SHALL PROVIDE ALL REQUIRED CUTTING, PATCHING, PAINTING, AND REPAIRS NECESSARY TO RESTORE DAMAGED SURFACES TO EQUAL OR BETTER THAN ORIGINAL CONDITIONS EXISTING AT THE START OF WORK.
35. ALL ELECTRICAL EQUIPMENT SHALL BE BRACED OR ANCHORED TO RESIST HORIZONTAL FORCE ACTING IN ANY DIRECTION IN ACCORDANCE WITH THE REQUIREMENTS OF THE LATEST EDITION OF ASCE7.
36. ALL INTERIOR AND ABOVE GRADE EXTERIOR CONDUIT INSTALLATION SHALL BE RIGID GALVANIZED STEEL, UNLESS EXCEPTED BY NOTE 37 BELOW.
37. ELECTRICAL METALLIC TUBING (EMT) MAY BE USED IN THE FOLLOWING CONDITIONS: INTERIOR APPLICATIONS, SMALLER THAN 2" TRADE SIZE DIAMETER AND INSTALLED EIGHT (8) FEET FROM FINISHED FLOOR OR HIGHER, OR INTERIOR APPLICATIONS, SMALLER THAN 2" TRADE SIZE DIAMETER AND ENTERING A PANEL FROM ABOVE.
38. CONNECTIONS TO VIBRATING EQUIPMENT (MOTOR, TRANSFORMER ENCLOSURE, ETC.) AND SEISMIC SEPARATIONS SHALL BE PROVIDED WITH LIQUID–TIGHT FLEXIBLE STEEL CONDUIT WITH WATERTIGHT CONNECTORS. MAXIMUM LENGTH OF CONDUIT SHALL BE SIX FEET, UNLESS OTHERWISE NOTED.
39. POLYVINYL CHLORIDE (PVC) SCHEDULE 40 MAY BE INSTALLED BENEATH SLAB AND UNDERGROUND INSTALLATION. INSTALL PVC COATED RIGID STEEL CONDUIT FOR TRANSITION FROM UNDERGROUND TO ABOVE GRADE INSTALLATION.
40. CONTRACTOR SHALL PROVIDE TERMINATIONS FOR ALL DATA/VOICE CABLES INDICATED AT OUTLET LOCATIONS INDICATED ON DRAWINGS.
41. CONTRACTOR SHALL PROVIDE AND INSTALL ACCESS PANELS IN NON–ACCESSIBLE CEILINGS WHERE REQUIRED TO ACCESS ELECTRICAL EQUIPMENT IN CEILING SPACE. ACCESS DOORS SHALL HAVE FIRE RATING EQUAL TO THE CEILING ASSEMBLY IN WHICH THEY ARE INSTALLED.
42. ALL FIRE LIFE SAFETY EQUIPMENT, SUCH AS FIRE ALARM CONTROL PANEL AND REMOTE POWER SUPPLIES SHALL BE PROVIDED WITH DEDICATED CIRCUITS. IDENTIFY CIRCUIT DESIGNATION AND PROVIDE PERMANENT LABELING, "FIRE ALARM CIRCUIT" ON ELECTRICAL PANEL. PROVIDE LOCKABLE CIRCUIT BREAKER.
43. CONTROL CONDUIT FOR ENERGY/BUILDING MANAGEMENT SYSTEM (E/BMS) SHALL BE PROVIDED AND INSTALLED BY ELECTRICAL CONTRACTOR.
44. ROUTE CONDUIT PARALLEL AND PERPENDICULAR TO WALLS AND ADJACENT PIPING. ARRANGE CONDUIT TO MAINTAIN HEADROOM AND TO PRESENT A NEAT APPEARANCE.
45. WHEN A DISCREPANCY IN QUANTITY OR SIZE OF CONDUIT, WIRE, EQUIPMENT, CIRCUIT BREAKERS, ETC., ARISES ON THE DRAWINGS OR SPECIFICATIONS, CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL MATERIAL REQUIRED BY THE MOST STRINGENT CONDITIONS NOTED ON THE DRAWINGS OR IN THE SPECIFICATIONS TO PROVIDE A COMPLETE AND OPERABLE SYSTEM, OR AS DIRECTED BY ENGINEER.
46. FOR SMALL AC MOTORS NOT HAVING BUILT–IN THERMAL OVERLOAD PROTECTION, PROVIDE MANUAL MOTOR STARTERS WITH OVERLOAD HEATER ELEMENTS SIZED PER MANUFACTURER'S RECOMMENDATION. FOR SMALL AC MOTORS WITH BUILT–IN THERMAL OVERLOAD PROTECTION, PROVIDE A HORSEPOWER RATED TOGGLE DISCONNECT SWITCH.
47. DISCONNECT SAFETY SWITCHES SHALL BE HEAVY DUTY AND BE RATED FOR THE NUMBER OF POLES, VOLTAGE, CURRENT AND HORSEPOWER RATING AS REQUIRED. PROVIDE FUSE PROTECTION BASED ON THE MOTOR NAMEPLATE RATINGS.
48. PROVIDE PERMANENT IDENTIFICATION (NAMEPLATES) FOR ALL ELECTRICAL PANELS, SWITCHBOARDS, MOTOR CONTROL CENTERS, DISCONNECT SWITCHES, TRANSFORMERS, TERMINAL CABINETS, ETC.
49. ELECTRICAL CONTRACTOR IS RESPONSIBLE TO VERIFY TYPE OF CEILING SYSTEMS AND TO FURNISH APPROVED LIGHTING FIXTURES OF THE TYPE REQUIRED FOR MOUNTING IN SUBJECT CEILING. PROVIDE ALL NECESSARY MOUNTING KIT/HARDWARE TO PROVIDE A COMPLETE WORKING LIGHTING SYSTEM.
50. ALL FINAL ELECTRICAL CONNECTIONS TO OWNER FURNISHED EQUIPMENT SHALL BE MADE BY THE ELECTRICAL CONTRACTOR.
51. ALL SPLICES AND TERMINALS SHALL BE COMPRESSION TYPE, OF SEAMLESS PURE COPPER, TIN PLATED, LONG BARREL, INSPECTION WINDOW, TERMINALS WITH TWO–HOLE PAD (WITH NEMA DRILLING). CLEAN ALL SURFACES AND INSTALL WITH OXIDE INHIBITING COMPOUND BURNDY PENETROX–E OR EQUAL. APPLY COMPOUND BETWEEN BUS BAR AND LUG PAD AND BETWEEN CONDUCTOR AND LUG BARREL. INSTALL COMPRESSION CONNECTORS WITH A FULLY CIRCUMFERENTIAL COMPRESSION DIE BURNDY HYPRESS OR EQUAL.
52. LABEL ALL CONDUIT WHERE IT BEGINS, AND WHERE IT TERMINATES INTO A BOX, PANEL, DEVICE, LOAD, OR DISCONNECT. CONDUIT SHALL BE LABELED EVERY 30 FEET OR LESS. CONDUIT SHALL BE LABELED WHERE IT PENETRATES ANY WALL OR FLOOR. LABEL SHALL BE PERMANENT PRINTED LABELS (DESCRIBING SOURCE, CIRCUIT, AND LOAD) LEGIBLE FROM FLOOR WHERE POSSIBLE (STANDING POSITION).
53. CONTRACTOR'S FAILURE TO ORDER OR RELEASE ORDER FOR MATERIALS AND/OR EQUIPMENT WILL NOT BE ACCEPTED AS A REASON TO SUBSTITUTE ALTERNATE MATERIALS, EQUIPMENT OR INSTALLATION METHODS.
54. PROVIDE ARC–FLASH HAZARD WARNING LABELS ON ALL AFFECTED ELECTRICAL EQUIPMENT, INCLUDING SWITCHBOARDS, PANEL BOARDS, INDUSTRIAL CONTROL PANELS, METER SOCKET ENCLOSURES, AND MOTOR CONTROL CENTERS. MARKING SHALL BE LOCATED SO AS TO BE CLEARLY VISIBLE TO QUALIFIED PERSONS. LABEL SHALL BE FACTORY PRE–PRINTED OR MACHINE–PRINTED SELF–ADHESIVE VINYL MATERIAL; UV, CHEMICAL, WATER, HEAT AND ABRASION RESISTANT; PRODUCED USING MATERIALS RECOGNIZED BY UL 969. MINIMUM SIZE: 3.5 BY 5 INCHES.
55. UNLESS OTHERWISE NOTED, ARRANGE, PAY FOR, COORDINATE AND PROVIDE ALL PERMITS NECESSARY FOR A COMPLETE AND OPERABLE SYSTEM.
56. ALL WORK IS <N> UNLESS OTHERWISE NOTED.
57. ELECTRICAL CONDUCTORS SERVING EQUIPMENT SUPPLIED BY POWER CONVERSION EQUIPMENT AS PART OF A VARIABLE FREQUENCY DRIVE (VFD) SYSTEM AND/OR A SERVO DRIVE SYSTEM SHALL HAVE THERMOSET INSULATION TYPE XHHW, OR XHHW–2

SYMBOLS & ABBREVIATIONS

SYMBOL	DESCRIPTION
	EXTENT OF DEMOLITION
	NEW TO EXISTING CONNECTION
1	WORK ITEM (ELECTRICAL)
1 / E-5.1	DETAIL DESIGNATION — DETAIL NUMBER; DRAWING NUMBER (IF BLANK, SAME SHEET)
CT / 1	EQUIPMENT DESIGNATION — EQUIPMENT TYPE; EQUIPMENT NUMBER
1 / E-5.1	SECTION DESIGNATION — SECTION NUMBER; DRAWING NUMBER (IF BLANK, SAME SHEET)
	EXISTING CONDUIT
	NEW CONDUIT
	CONDUIT TO BE DEMOLISHED
	PANEL BOARD/TERMINAL CABINET – FLUSH/SURFACE MOUNTED
	BRANCH CIRCUIT WIRING IN CONDUIT CONCEALED IN CEILING SPACE OR WHERE POSSIBLE, EXPOSED ON ROOF OR BUILDING EXTERIOR.
	BRANCH CIRCUIT WIRING IN CONDUIT CONCEALED UNDER FLOOR, UNDERGROUND OR WHERE POSSIBLE.
*	BRANCH CIRCUIT HOME RUN TO PANEL. CONCEALED IN CEILING SPACE OR WHERE POSSIBLE. *= PANEL BOARD & CIRCUIT #
	EXISTING DEVICES, CONDUITS, WIRES, ETC TO REMAIN
	NEW (BOLD) DEVICES, CONDUITS, WIRES, ETC.
	CONDUIT UP
	CONDUIT DOWN
	WALL MOUNTED DUPLEX RECEPTACLE 20A, 125V, 3WG, NEMA 5–20R, +18"AFF
C	WALL MOUNTED DUPLEX CONTROL RECEPTACLE
WP GFI	DUPLEX GFI RECEPTACLE, WEATHERPROOF, 20A, 165V, 3WG, NEMA 5–20R, GFI
	WALL–MOUNTED DOUBLE DUPLEX RECEPTACLE 20A, 125V, 3WG, (2) NEMA 5–20R, +18" UON
	SPECIAL RECEPTACLE (TYPE AND CONFIGURATION AS NOTED)
	(1) RJ–45 DATA OUTLET (1) RJ–11 VOICE OUTLET W/ FACE PLATE
	(1) RJ–45 DATA OUTLET – CEILING
	CEILING–MOUNTED DUPLEX RECEPTACLE 20A, 125V, 3WG, NEMA 5–20R
	CEILING–MOUNTED DOUBLE DUPLEX RECEPTACLE 20A, 125V, 3WG, (2) NEMA 5–20R
	FLOOR–MOUNTED DUPLEX RECEPTACLE 20A, 125V, 3WG, NEMA 5–20R
	(1) RJ–45 DATA OUTLET (1) RJ–11 VOICE OUTLET W/ FACE PLATE — FLOOR MOUNTED
PP	POWER POLE
MM	MULTI MEDIA RECEPTACLE
J, J, J	JUNCTION BOX – CEILING/FLOOR/ROOF/WALL MOUNTED
T	TRANSFORMER
$a	DIMMER SWITCH, LOWER CASE LETTER INDICATES CIRCUIT CONTROLLED BY SWITCH, +44" AFF.
OS	DUAL TECHNOLOGY OCCUPANCY SENSOR – CEILING
RC	DIMMING ROOM CONTROLLER
PC	DAYLIGHT PHOTO SENSOR – CEILING
NB	NETWORK BRIDGE
	DISCONNECT SWITCH – NON FUSED
	DISCONNECT SWITCH – FUSED
	DISCONNECT SWITCH & MOTOR STARTER–COMBINATION
@	AT
AHJ	AUTHORITY HAVING JURISDICTION
BLDG	BUILDING
C	CONDUIT
CB	CIRCUIT BREAKER
℄	CENTERLINE
CLG	CEILING
CKT	CIRCUIT
C.O.	CONDUIT ONLY (W/PULLROPE)
CONT	CONTINUATION
CSFM	CALIFORNIA STATE FIRE MARSHALL
DLM	DIGITAL LIGHTING MANAGEMENT (WATTSTOPPER)
DN	DOWN
DWG	DRAWING
<E>	EXISTING
ELEC	ELECTRICAL
EM	EMERGENCY
EM	ELECTRICAL MANHOLE
EQ	EQUAL
EQUIP.	EQUIPMENT
<ERR>	EXISTING TO REMAIN AND BE RECONNECTED
<F>	FUTURE
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FATC	FIRE ALARM TERMINAL CABINET
FLR	FLOOR
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
IOR	INSPECTOR OF RECORD
LTG	LIGHTING
LTS	LIGHTS
MAX.	MAXIMUM
MIN.	MINIMUM
<N>	**NEW (BOLD)**
N.T.S.	NOT TO SCALE
PNL	PANEL
<RR>	REMOVE AND RELOCATE
<REL>	RELOCATED
REC	RECEPTACLE
RM	ROOM
RPS	REMOTE POWER SUPPLY
SPB	SIGNAL PULL BOX
SPECS	SPECIFICATIONS
TYP	TYPICAL
TP	TWISTED PAIR (SHIELDED)
U.O.N.	UNLESS OTHERWISE NOTED
V	VOLT
VA	VOLT AMP
V.I.F.	VERIFY IN FIELD
W	WATTS
WP	WEATHERPROOF (NEMA 3R)

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SUBSTATION #3 & #4 REPLACEMENT

DSA APPL #XX-XXXXXX

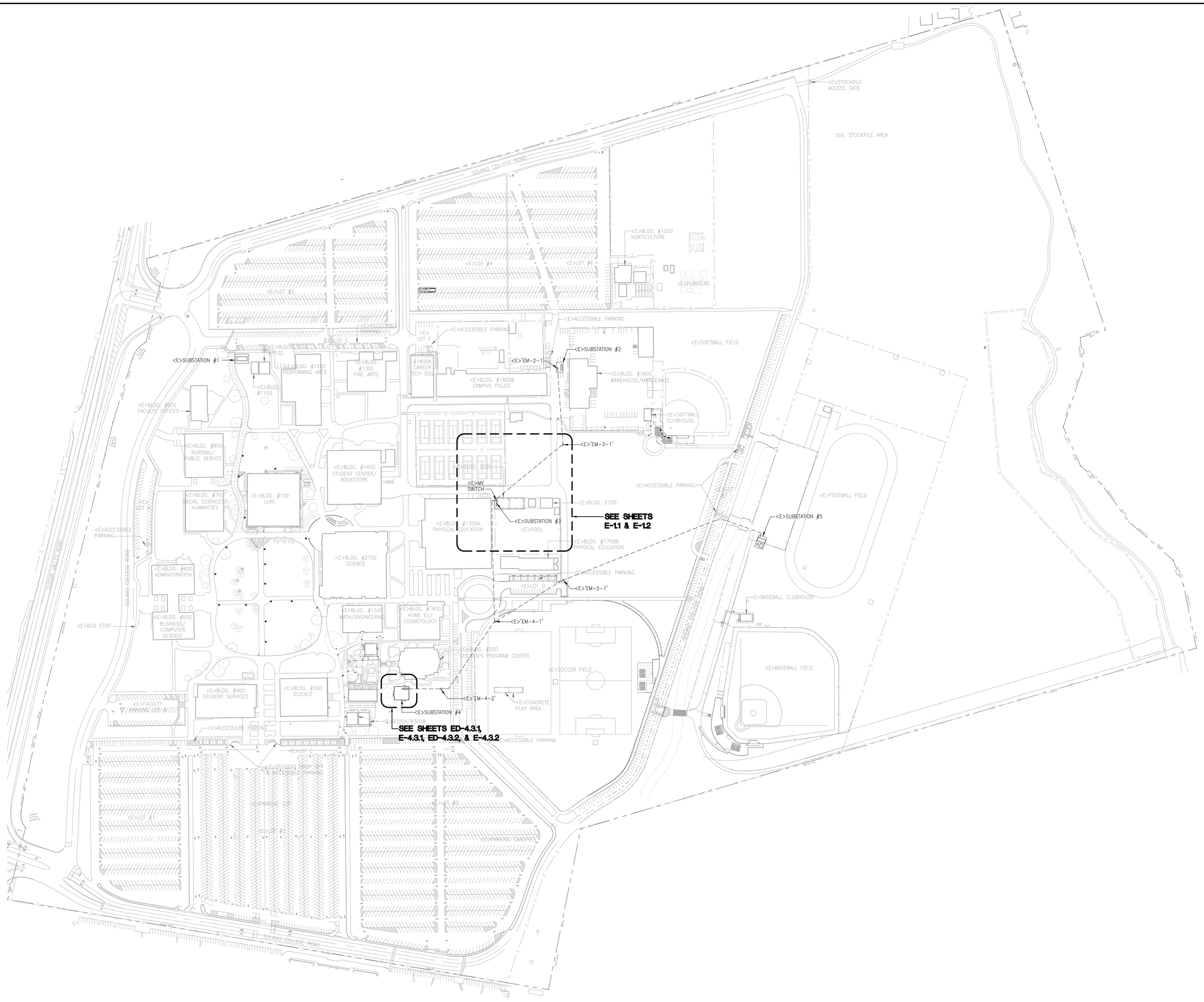
ISSUE		
MARK	DATE	DESCRIPTION
	08/16/22	D&B BRIDGING DRAWING SET

SOBE PROJECT NO:	2200690
DATE:	08/15/22
DRAWN BY:	
CHECKED BY:	MM
APPROVED BY:	HK

SHEET TITLE
ELECTRICAL GENERAL NOTES, SYMBOLS & ABBREVIATIONS

SCALE: AS NOTED
THIS DRAWING IS 30" X 42" AT FULL SIZE

E-0.1
SHEET OF XX



1 OVERALL SITE PLAN
SCALE: 1" = 120' - 0"

0 120' 240'

N

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SUBSTATION #3 & #4 REPLACEMENT

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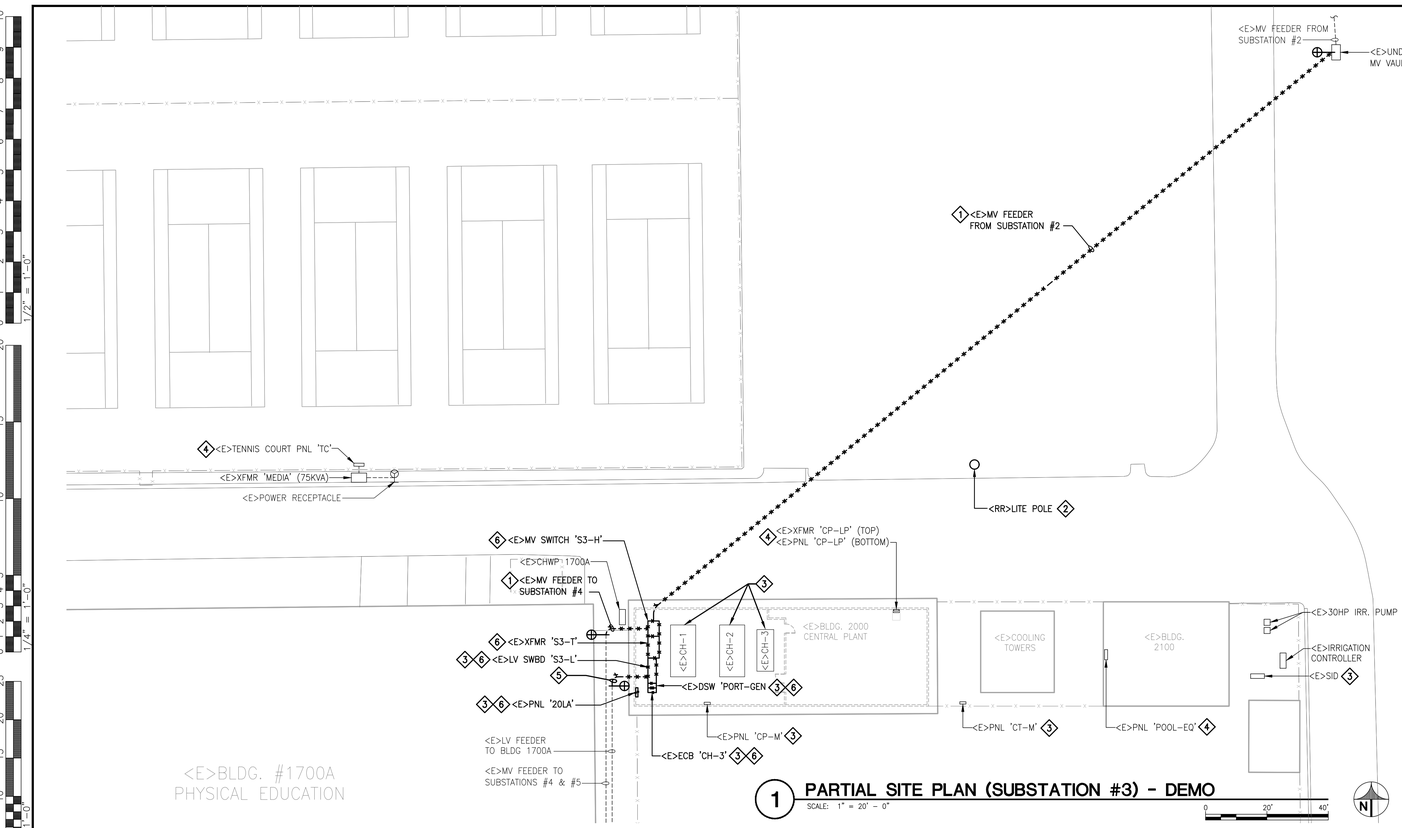
DRAWN BY:	
CHECKED BY:	MM
APPROVED BY:	HK

SHEET TITLE

ELECTRICAL OVERALL SITE PLAN

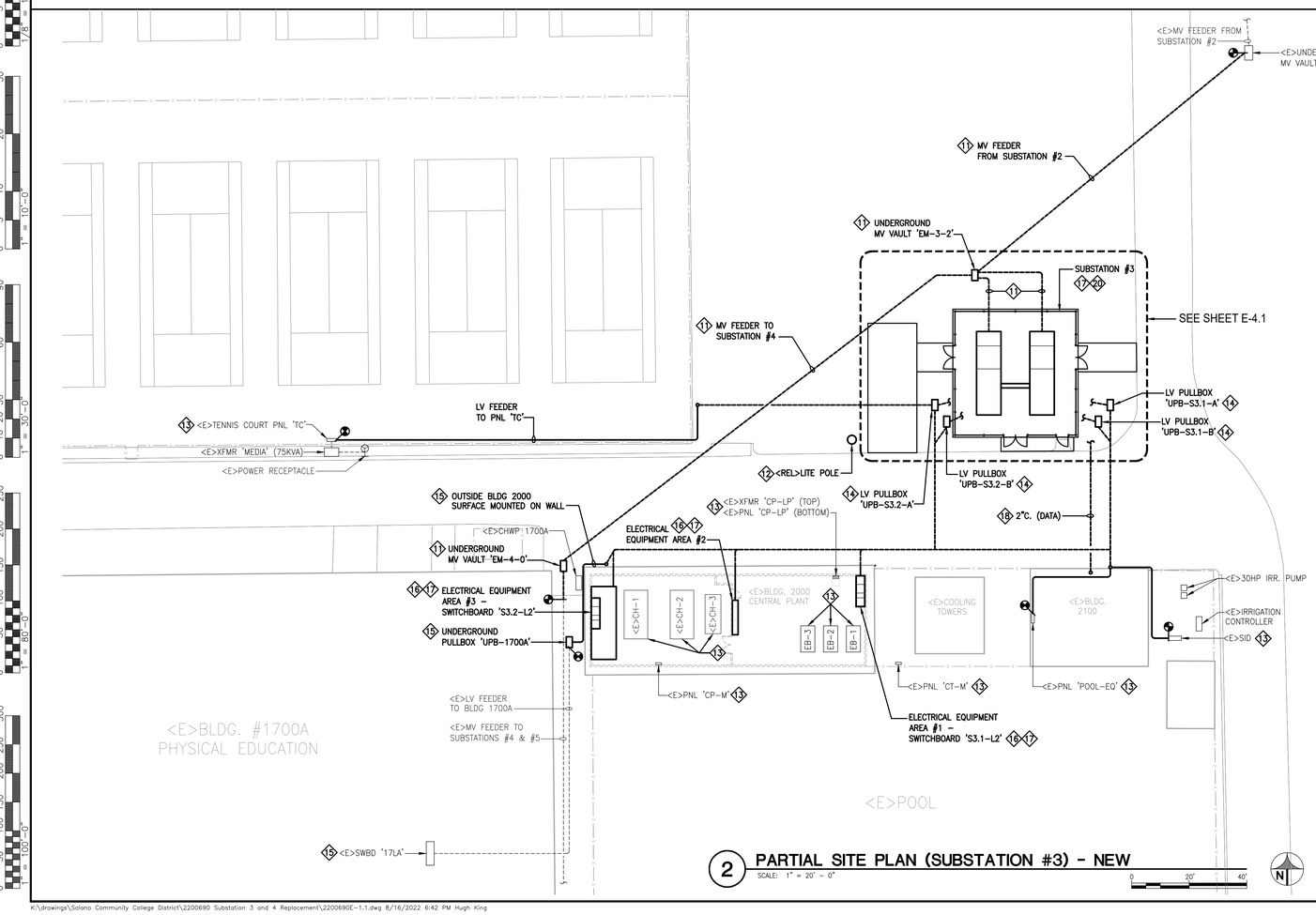
SCALE: AS NOTED
THIS DRAWING IS 30" X 42" AT FULL SIZE

E-1.0
SHEET OF XX



1 PARTIAL SITE PLAN (SUBSTATION #3) - DEMO

SCALE: 1" = 20' - 0"



2 PARTIAL SITE PLAN (SUBSTATION #3) - NEW

SCALE: 1" = 20' - 0"

REFERENCE SHEET NOTES

DEMO:

1. REMOVE AND REPLACE EXISTING MV TRANSITE CONDUIT AND FEEDER AFTER INSTALLATION OF NEW SUBSTATION #3. MAINTAIN POWER TO ALL EQUIPMENT DURING CONSTRUCTION. PROVIDE DMOP AND PHASING PLAN.
2. RELOCATE EXISTING LIGHTING POLE IF NECESSARY. REFER TO NEW WORK FOR NEW LOCATION.
3. REMOVE EXISTING FEEDERS FROM EXISTING LV SWITCHBOARD 'S3-L' TO FOLLOWING EQUIPMENT:
   - <E> SID
   - <E> PNL 'CT-M'
   - <E> PNL 'CP-M'
   - <E> PANEL '20LA'
   - <E> DISCONNECT 'PORT-GEN'
   - <E> CHILLER 'CH-1'
   - <E> CHILLER 'CH-2'
   - <E> ECB 'CH-3' AND CHILLER 'CH-3'
4. REMOVE EXISTING FEEDERS FROM EXISTING PANEL '20LA' TO FOLLOWING EQUIPMENT:
   - <E> POOL EQ PANELBOARD
   - <E> TENNIS COURT PANELBOARD
   - <E> XFMR 'CP-LP'
5. REMOVE EXISTING LV FEEDER FOR SWITCHBOARD '17LA' AS NECESSARY.
6. REMOVE FOLLOWING EQUIPMENT:
   - <E> MV SWITCH 'S3-H'
   - <E> XFMR 'S3-T'
   - <E> LV SWITCHBOARD 'S3-L'
   - <E> DISCONNECT 'PORT-GEN'
   - <E> ECB 'CH-3'
   - <E> PANEL '20LA' AND ALL FEEDERS AND WIRING DOWNSTREAM OF PNL '20LA'

NEW WORK:

11. DESIGN, PROVIDE, AND INSTALL NEW MV FEEDERS, AND CONNECT THEM TO EXISTING MV FEEDER. DESIGN, PROVIDE AND INSTALL FOLLOWING MV VAULTS:
    - <N> EM-3-2
    - <N> EM-4-0
12. PROPOSED NEW LOCATION OF EXISTING LIGHTING POLE.
13. DESIGN, PROVIDE, AND INSTALL NEW FEEDERS FROM UPSTREAM SWITCHBOARD/PANELBOARD TO FOLLOWING EQUIPMENT:
    - <E> SID
    - <E> PNL 'CT-M'
    - <E> PNL 'CP-M'
    - <E> CHILLER 'CH-1'
    - <E> CHILLER 'CH-2'
    - <E> CHILLER 'CH-3'
    - <E> POOL EQ PANELBOARD
    - <E> TENNIS COURT PANELBOARD
    - <E> XFMR 'CP-LP'
    - <N> ELECTRIC BOILER 'EB-1'
    - <N> ELECTRIC BOILER 'EB-2'
    - <N> ELECTRIC BOILER 'EB-3'

    REFER TO NEW SINGLE LINE DIAGRAM FOR UPSTREAM SWITCHBOARD/PANELBOARD AND ADDITIONAL INFORMATION.
14. DESIGN, PROVIDE AND INSTALL FOLLOWING UNDERGROUND LV PULL BOXES:
    - <N> UPB-S3.1-A
    - <N> UPB-S3.1-B
    - <N> UPB-S3.2-A
    - <N> UPB-S3.2-B

    DESIGN, PROVIDE, AND INSTALL ADDITIONAL UNDERGROUND PULL BOXES IF NECESSARY.
    DESIGN, PROVIDE, AND INSTALL (6) 4" SPARE CONDUITS (FOR FUTURE BREAKERS) FROM <N> LV SWITCHBOARD 'S3.1-L1' TO <N> UPB-S3.1-A.
    DESIGN, PROVIDE, AND INSTALL (6) 4" SPARE CONDUITS (FOR FUTURE BREAKERS) FROM <N> LV SWITCHBOARD 'S3.2-L1' TO <N> UPB-S3.2-A.
    REFER TO NEW SINGLE LINE DIAGRAM FOR ADDITIONAL INFORMATION.
15. INTERCEPT AND EXTEND EXISTING FEEDER FOR SWITCHBOARD '17LA' TO NEW SWITCHBOARD 'S3.1-L1' AS NECESSARY. INCREASE EXISTING FEEDER'S SIZE FOR 2% VOLTAGE DROP, OR MOVE NEW FEEDER BREAKER FOR BUILDING 1700A FROM SWITCHBOARD 'S3.1-L1' TO SWITCHBOARD 'S3.1-L2' IF NECESSARY AND POSSIBLE. DESIGN, PROVIDE AND INSTALL NEW UNDERGROUND PULL BOX 'UPB-1700A'. REFER TO SINGLE LINE DIAGRAM FOR MORE INFORMATION.
16. DESIGN, PROVIDE, AND INSTALL FOLLOWING EQUIPMENT:
    - <N> LV DISTRIBUTION SWITCHBOARD 'S3.1-L2'
    - <N> LV DISTRIBUTION SWITCHBOARD 'S3.2-L2'

    USE ELECTRICAL EQUIPMENT AREAS #1, #2, AND #3 FOR FOLLOWING EQUIPMENT:
    - <N> LV DISTRIBUTION SWITCHBOARD 'S3.1-L2'
    - <N> LV DISTRIBUTION SWITCHBOARD 'S3.2-L2'

    SPLIT/DIVIDE SWITCHBOARDS 'S3.1-L2' AND 'S3.2-L2' INTO SMALLER SWITCHBOARDS/SECTIONS IF SWITCHBOARDS DO NOT FIT IN AVAILABLE SPACE FOR ELECTRICAL EQUIPMENT, OR INSTALL SWITCHBOARDS TO OTHER AVAILABLE SPACES FOR ELECTRICAL EQUIPMENT IF NECESSARY.
17. DESIGN, PROVIDE, AND INSTALL LV FEEDERS FOR FOLLOWING EQUIPMENT:
    - <N> LV DISTRIBUTION SWITCHBOARD 'S3.1-L2'
    - <N> LV DISTRIBUTION SWITCHBOARD 'S3.2-L2'
    - ADDITIONAL SWITCHBOARDS IF REQUIRED AS PER SPACE LIMITATIONS IN KEYNOTE #16.
18. DESIGN, PROVIDE, AND INSTALL (1) 2" UNDERGROUND CONDUIT FOR DATA SYSTEM CONNECTION TO POWER METER. PROVIDE CONNECTION BETWEEN POWER METER AND COLLEGE NETWORK.
19. NOT USED.
20. MODIFY/REPAIR EXISTING IRRIGATION SPRINKLER SYSTEM AS NECESSARY.

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SUBSTATION #3 & #4 REPLACEMENT

DSA APPL #XX-XXXXXX

ISSUE		
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	08/16/22	D&B BRIDGING DRAWING SET

SOBE PROJECT NO:	2200690
DATE:	08/15/22
DRAWN BY:	
CHECKED BY:	MM
APPROVED BY:	HK

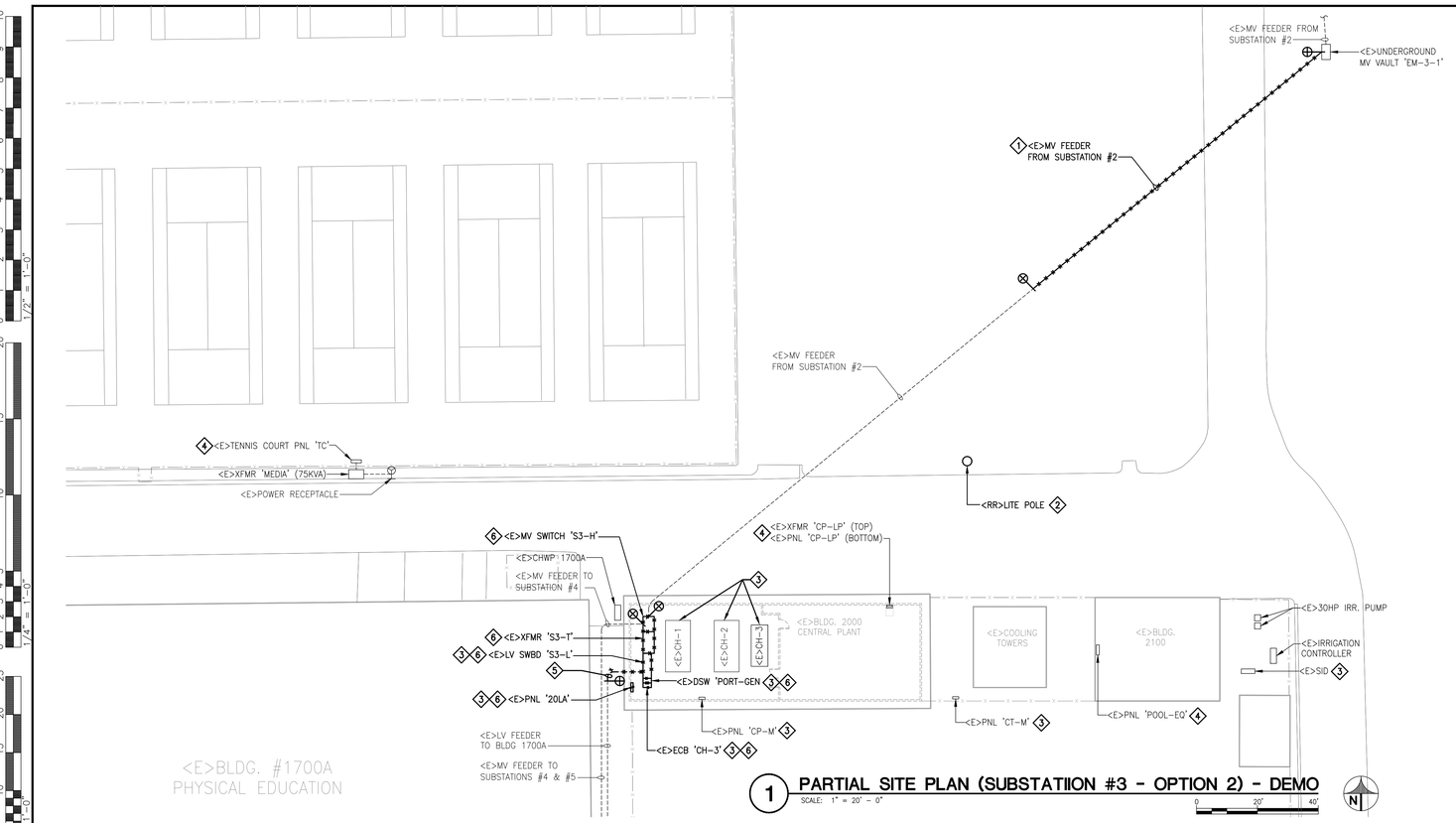
SHEET TITLE

ELECTRICAL PARTIAL SITE PLAN (SUBSTATION #3)

SCALE:	AS NOTED
THIS DRAWING IS 30" X 42" AT FULL SIZE	

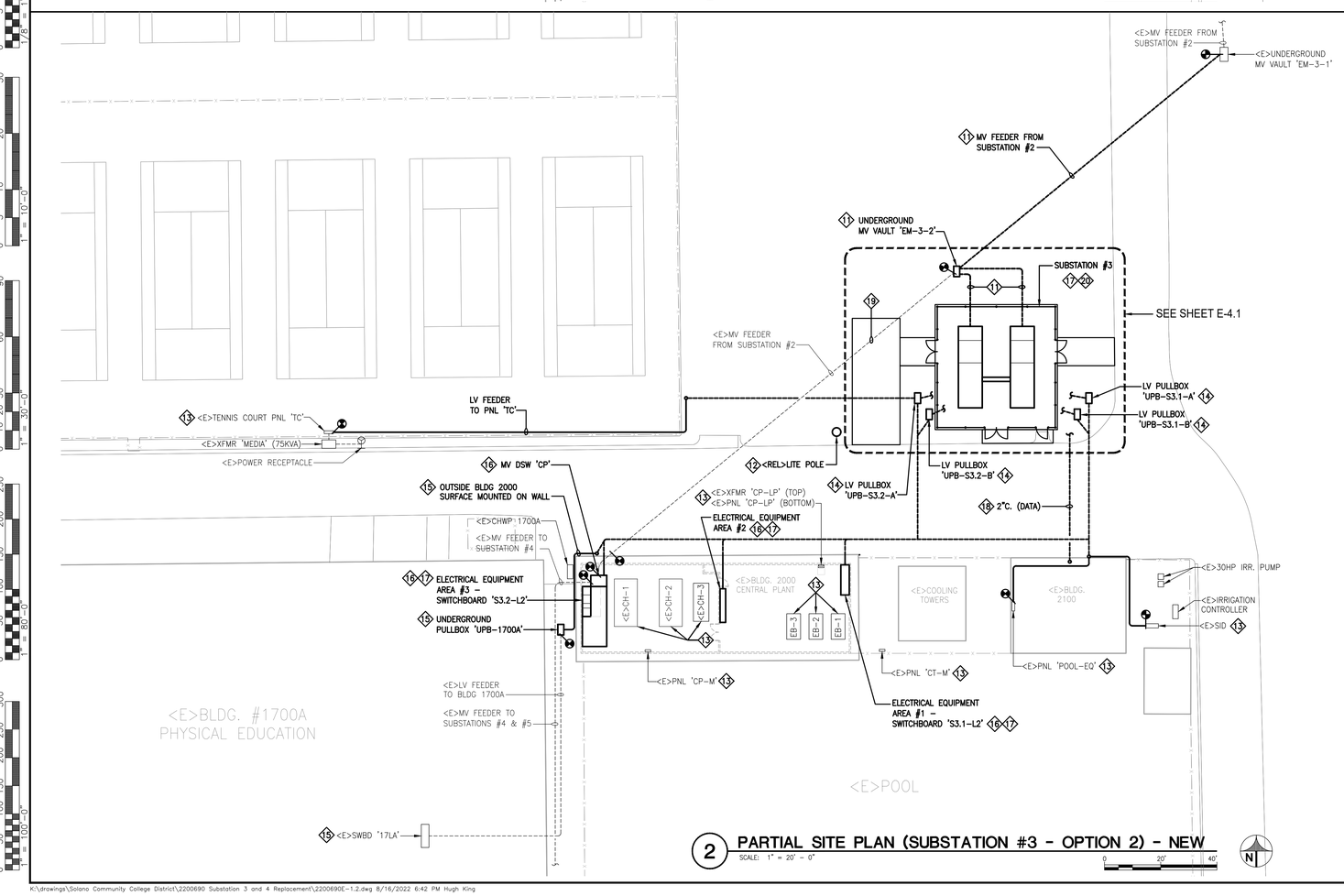
E-1.1

SHEET OF XX



1 PARTIAL SITE PLAN (SUBSTATIION #3 - OPTION 2) - DEMO

SCALE: 1" = 20' - 0"



2 PARTIAL SITE PLAN (SUBSTATION #3 - OPTION 2) - NEW

SCALE: 1" = 20' - 0"

REFERENCE SHEET NOTES

DEMO:

1. REMOVE AND REPLACE EXISTING MV TRANSITE CONDUIT AND FEEDER AFTER INSTALLATION OF NEW SUBSTATION #3. MAINTAIN POWER TO ALL EQUIPMENT DURING CONSTRUCTION. PROVIDE DMOP AND PHASING PLAN.
2. RELOCATE EXISTING LIGHTING POLE IF NECESSARY. REFER TO NEW WORK FOR NEW LOCATION.
3. REMOVE EXISTING FEEDERS FROM EXISTING LV SWITCHBOARD 'S3-L' TO FOLLOWING EQUIPMENT:
   - <E> SID
   - <E> PNL 'CT-M'
   - <E> PNL 'CP-M'
   - <E> PANEL '20LA'
   - <E> DISCONNECT 'PORT-GEN'
   - <E> CHILLER 'CH-1'
   - <E> CHILLER 'CH-2'
   - <E> ECB 'CH-3' AND CHILLER 'CH-3'
4. REMOVE EXISTING FEEDERS FROM EXISTING PANEL '20LA' TO FOLLOWING EQUIPMENT:
   - <E> POOL EQ PANELBOARD
   - <E> TENNIS COURT PANELBOARD
   - <E> XFMR 'CP-LP'
5. REMOVE EXISTING LV FEEDER FOR SWITCHBOARD '17LA' AS NECESSARY.
6. REMOVE FOLLOWING EQUIPMENT:
   - <E> MV SWITCH 'S3-H'
   - <E> XFMR 'S3-T'
   - <E> LV SWITCHBOARD 'S3-L'
   - <E> DISCONNECT 'PORT-GEN'
   - <E> ECB 'CH-3'
   - <E> PANEL '20LA' AND ALL FEEDERS AND WIRING DOWNSTREAM OF PNL '20LA'

NEW WORK:

11. DESIGN, PROVIDE, AND INSTALL NEW MV FEEDERS, AND CONNECT THEM TO EXISTING MV FEEDER. DESIGN, PROVIDE AND INSTALL FOLLOWING MV VAULTS:
    - <N> EM-3-2
12. PROPOSED NEW LOCATION OF EXISTING LIGHTING POLE.
13. DESIGN, PROVIDE, AND INSTALL NEW FEEDERS FROM UPSTREAM SWITCHBOARD/PANELBOARD TO FOLLOWING EQUIPMENT:
    - <E> SID
    - <E> PNL 'CT-M'
    - <E> PNL 'CP-M'
    - <E> CHILLER 'CH-1'
    - <E> CHILLER 'CH-2'
    - <E> CHILLER 'CH-3'
    - <E> POOL EQ PANELBOARD
    - <E> TENNIS COURT PANELBOARD
    - <E> XFMR 'CP-LP'
    - <N> ELECTRIC BOILER 'EB-1'
    - <N> ELECTRIC BOILER 'EB-2'
    - <N> ELECTRIC BOILER 'EB-3'

    REFER TO NEW SINGLE LINE DIAGRAM FOR UPSTREAM SWITCHBOARD/PANELBOARD AND ADDITIONAL INFORMATION.
14. DESIGN, PROVIDE AND INSTALL FOLLOWING UNDERGROUND LV PULL BOXES:
    - <N> UPB-S3.1-A
    - <N> UPB-S3.1-B
    - <N> UPB-S3.2-A
    - <N> UPB-S3.2-B

    DESIGN, PROVIDE, AND INSTALL ADDITIONAL UNDERGROUND PULL BOXES IF NECESSARY.
    DESIGN, PROVIDE, AND INSTALL (6) 4" SPARE CONDUITS (FOR FUTURE BREAKERS) FROM <N> LV SWITCHBOARD 'S3.1-L1' TO <N> UPB-S3.1-A.
    DESIGN, PROVIDE, AND INSTALL (6) 4" SPARE CONDUITS (FOR FUTURE BREAKERS) FROM <N> LV SWITCHBOARD 'S3.2-L1' TO <N> UPB-S3.2-A.
    REFER TO NEW SINGLE LINE DIAGRAM FOR ADDITIONAL INFORMATION.
15. INTERCEPT AND EXTEND EXISTING FEEDER FOR SWITCHBOARD '17LA' TO NEW SWITCHBOARD 'S3.1-L1' AS NECESSARY. INCREASE EXISTING FEEDER'S SIZE FOR 2% VOLTAGE DROP, OR MOVE NEW FEEDER BREAKER FOR BUILDING 1700A FROM SWITCHBOARD 'S3.1-L1' TO SWITCHBOARD 'S3.1-L2' IF NECESSARY AND POSSIBLE. DESIGN, PROVIDE AND INSTALL NEW UNDERGROUND PULL BOX 'UPB-1700A'. REFER TO SINGLE LINE DIAGRAM FOR MORE INFORMATION.
16. DESIGN, PROVIDE, AND INSTALL FOLLOWING EQUIPMENT:
    - <N> LV DISTRIBUTION SWITCHBOARD 'S3.1-L2'
    - <N> LV DISTRIBUTION SWITCHBOARD 'S3.2-L2'
    - <N> MV DISCONNECT SWITCH 'CP'

    USE ELECTRICAL EQUIPMENT AREAS #1, #2, AND #3 FOR FOLLOWING EQUIPMENT:
    - <N> LV DISTRIBUTION SWITCHBOARD 'S3.1-L2'
    - <N> LV DISTRIBUTION SWITCHBOARD 'S3.2-L2'

    SPLIT/DIVIDE SWITCHBOARDS 'S3.1-L2' AND 'S3.2-L2' INTO SMALLER SWITCHBOARDS/SECTIONS IF SWITCHBOARDS DO NOT FIT IN AVAILABLE SPACE FOR ELECTRICAL EQUIPMENT, OR INSTALL SWITCHBOARDS TO OTHER AVAILABLE SPACES FOR ELECTRICAL EQUIPMENT IF NECESSARY.
17. DESIGN, PROVIDE, AND INSTALL LV FEEDERS FOR FOLLOWING EQUIPMENT:
    - <N> LV DISTRIBUTION SWITCHBOARD 'S3.1-L2'
    - <N> LV DISTRIBUTION SWITCHBOARD 'S3.2-L2'
    - ADDITIONAL SWITCHBOARDS IF REQUIRED AS PER SPACE LIMITATIONS IN KEYNOTE #16.
18. DESIGN, PROVIDE, AND INSTALL (1) 2" UNDERGROUND CONDUIT FOR DATA SYSTEM CONNECTION TO POWER METER. PROVIDE CONNECTION BETWEEN POWER METER AND COLLEGE NETWORK.
19. FIELD VERIFY DEPTH AND COVER OF EXISTING MV FEEDER UNDER DRIVEWAY, AND DESIGN, PROVIDE, AND INSTALL FEEDER PROTECTION AS PER NEC-300.50 IF NECESSARY.
20. MODIFY/REPAIR EXISTING IRRIGATION SPRINKLER SYSTEM AS NECESSARY.

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SUBSTATION #3 & #4 REPLACEMENT

DSA APPL #XX-XXXXXX

ISSUE		
MARK	DATE	DESCRIPTION
	08/16/22	D&B BRIDGING DRAWING SET

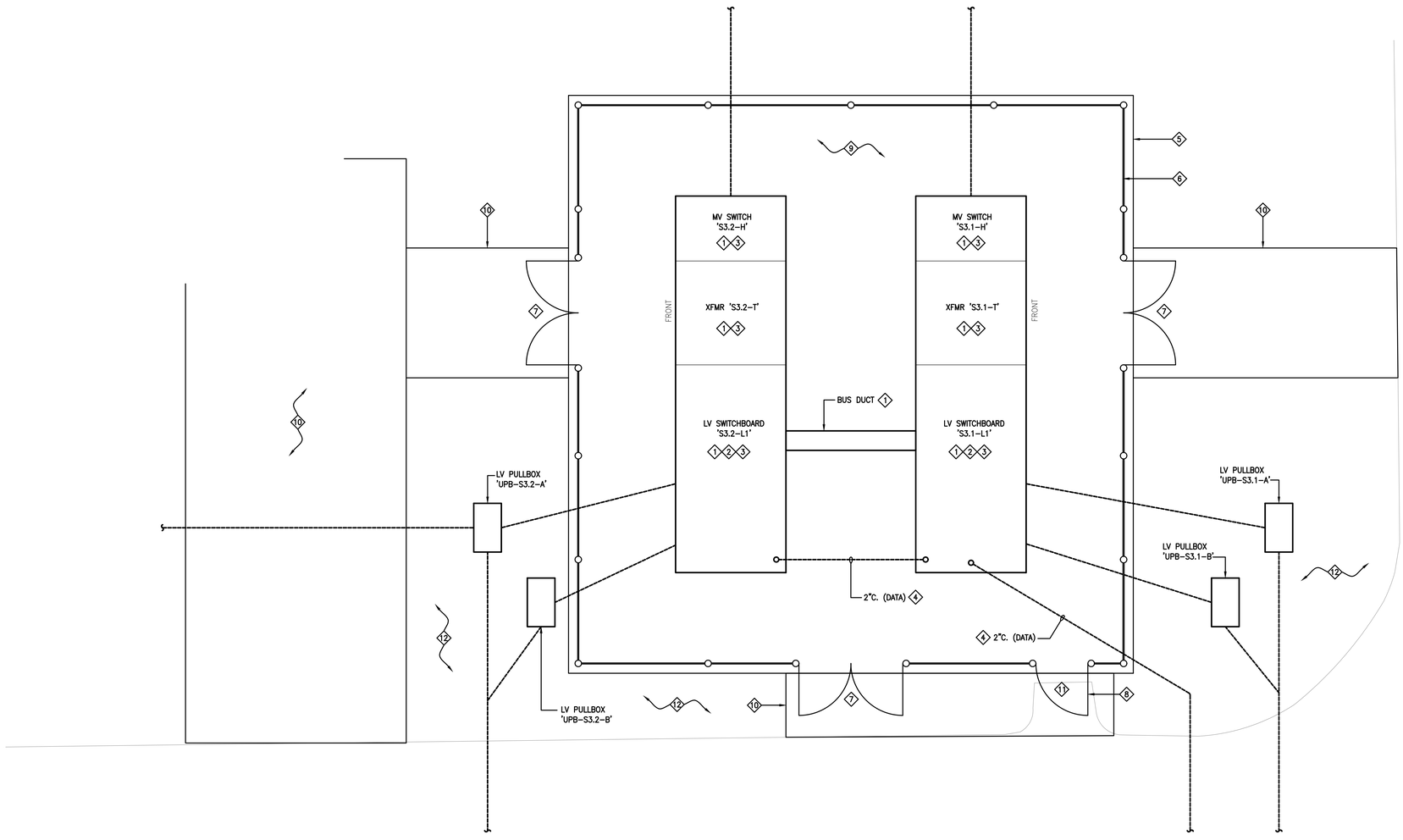
SOBE PROJECT NO:	2200690
DATE:	08/15/22
DRAWN BY:	
CHECKED BY:	MM
APPROVED BY:	HK

SHEET TITLE

ELECTRICAL
PARTIAL SITE PLAN
(SUBSTATION #3 - OPTION 2)

SCALE: AS NOTED
THIS DRAWING IS 30" X 42" AT FULL SIZE

E-1.2
SHEET OF XX



1 SUBSTATION #3 PLAN
SCALE: 1/4" = 1'-0"

0 4' 8'

N

REFERENCE SHEET NOTES

1. DESIGN, PROVIDE, AND INSTALL FOLLOWING EQUIPMENT:
   - <N> MV SWITCH 'S3.1-H'
   - <N> MV SWITCH 'S3.2-H'
   - <N> XFMR 'S3.1-T'
   - <N> XFMR 'S3.2-T'
   - <N> LV SWITCHBOARD 'S3.1-L1'
   - <N> LV SWITCHBOARD 'S3.2-L1'
   - <N> 4,000A BUS DUCT BETWEEN SWBD 'S3.1-L1' AND SWBD 'S3.2-L1'

   TRANSFORMERS TO BE FROM ZETRAK S.A. DE C.V.:
   CONTACT POWERSYSTEMS GROUP, LLC.
   +1 (682) 307-7380
   EMAIL: robertr@pwrsystemsgroup.com
2. DESIGN, PROVIDE, AND INSTALL LV FEEDERS FOR FOLLOWING EQUIPMENT:
   - <N> LV DISTRIBUTION SWITCHBOARD 'S3.1-L2'
   - <N> LV DISTRIBUTION SWITCHBOARD 'S3.2-L2'
3. DESIGN, PROVIDE, AND INSTALL NEW GROUNDING SYSTEM AS PER NEC – ARTICLE 250.
4. DESIGN, PROVIDE, AND INSTALL (1) 2" UNDERGROUND CONDUIT FOR DATA SYSTEM CONNECTION TO POWER METER. PROVIDE CONNECTION BETWEEN METER AND COLLEGE NETWORK.
5. DESIGN, PROVIDE, AND INSTALL NEW REINFORCED CONCRETE PAD.
6. DESIGN, PROVIDE, AND INSTALL NEW CHAINLINK FENCE WITH SLATS.
7. DESIGN, PROVIDE, AND INSTALL NEW DOUBLE-DOOR GATES (TOTAL OF (3)).
8. DESIGN, PROVIDE, AND INSTALL NEW PERSONNEL GATE.
9. DESIGN, PROVIDE, AND INSTALL NEW LIGHTING SYSTEM.
10. DESIGN, PROVIDE, AND INSTALL NEW CONCRETE DRIVEWAYS (TOTAL OF (3)).
11. DESIGN, PROVIDE, AND INSTALL NEW CONCRETE WALKWAY.
12. PAVED AREA: DESIGN, PROVIDE, AND INSTALL NEW PAVEMENT.

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SUBSTATION #3 & #4 REPLACEMENT

DSA APPL #XX-XXXXXX

ISSUE		
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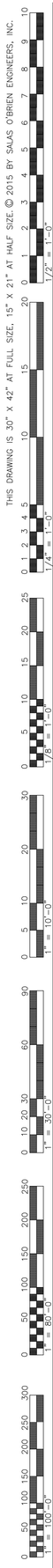
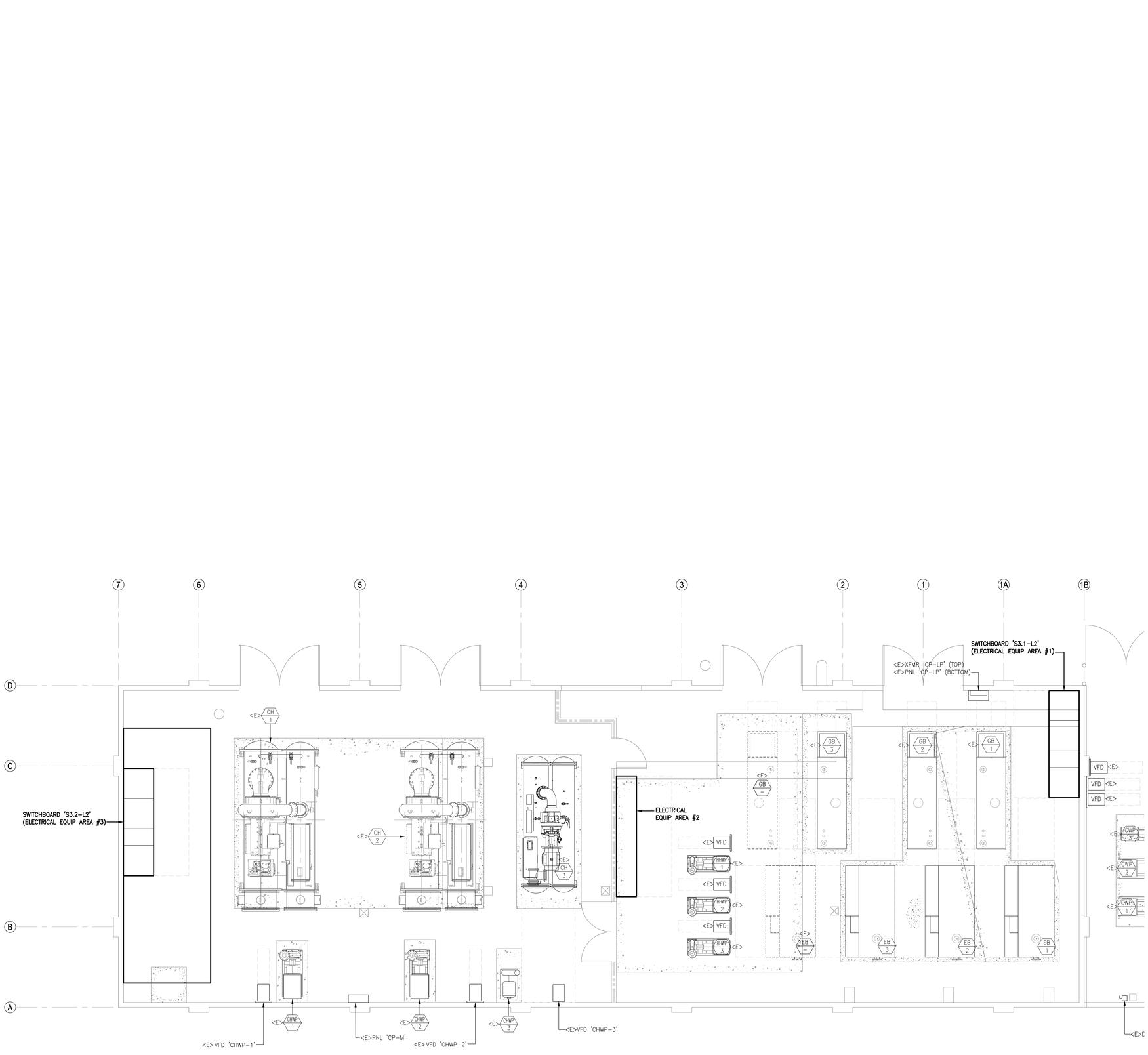
CHECKED BY:	MM
APPROVED BY:	HK

SHEET TITLE
ELECTRICAL
SUBSTATION #3 PLAN

SCALE: AS NOTED
THIS DRAWING IS 30" X 42" AT FULL SIZE

E-4.1
SHEET OF XX





1 CENTRAL PLANT FLOOR PLAN
SCALE: 1/4" = 1' - 0"

0 4' 8'

N

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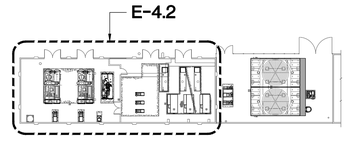
SUBSTATION #3 & #4 REPLACEMENT

DSA APPL #XX-XXXXXX

ISSUE MARK	DATE	DESCRIPTION
	08/16/22	D&B BRIDGING DRAWING SET

KEY PLAN

N

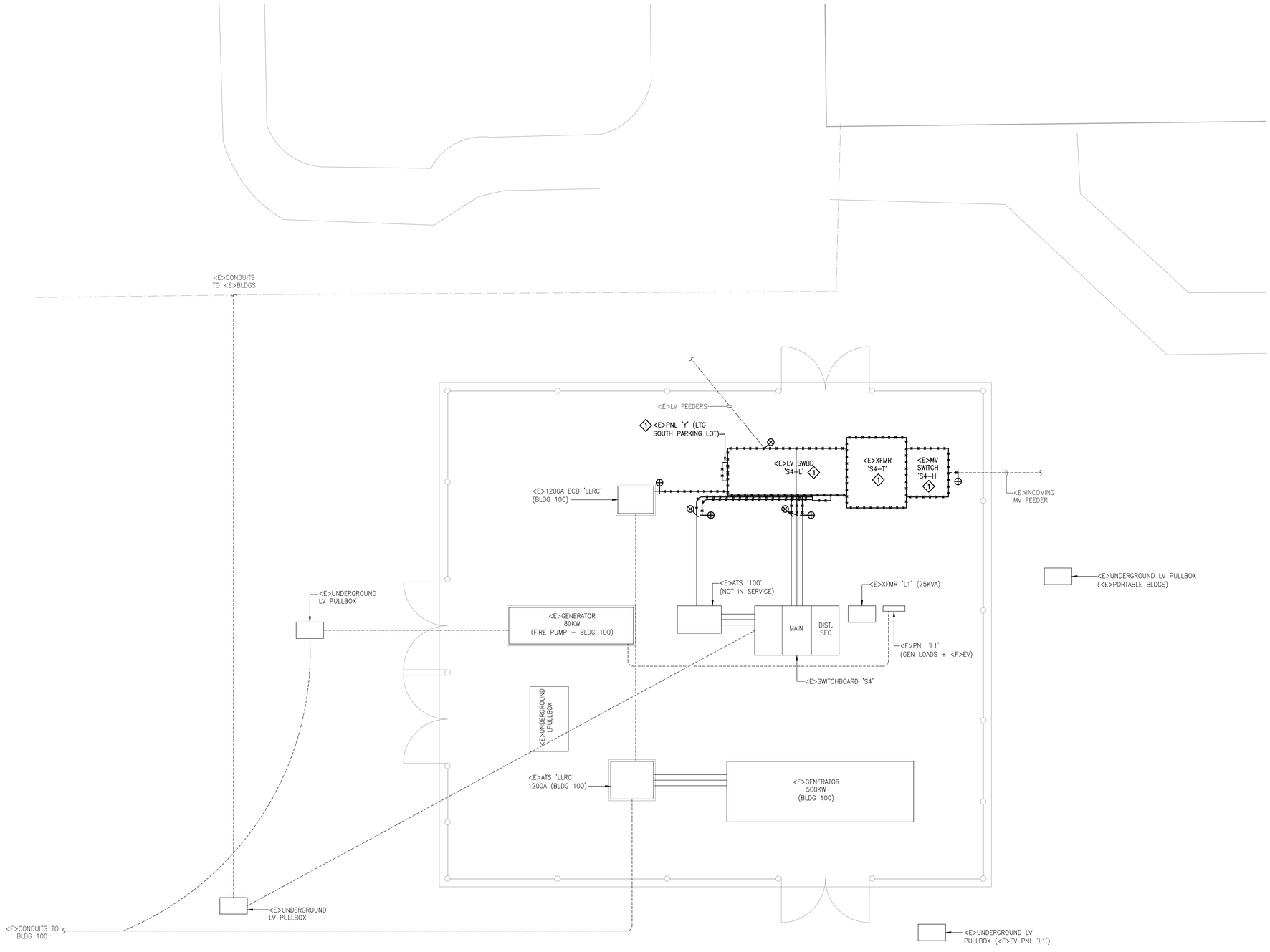


SOBE PROJECT NO:	2200690
DATE:	08/15/22
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	HK

SHEET TITLE
ELECTRICAL
CENTRAL PLANT FLOOR PLAN

SCALE: AS NOTES
THIS DRAWING IS 30" X 42" AT FULL SIZE

E-4.2
SHEET OF XX



1 **SUBSTATION #4 PLAN - DEMO**
SCALE: 1/4" = 1' - 0"

REFERENCE SHEET NOTES

1. REMOVE FOLLOWING EQUIPMENT:
   - <E> MV SWITCH 'S4-H'
   - <E> XFMR 'S4-T'
   - <E> LV SWITCHBOARD 'S4-L'
   - <E> PANEL 'Y' ALONG WITH INCOMING FEEDER

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SUBSTATION #3 & #4 REPLACEMENT

DSA APPL #XX-XXXXXX

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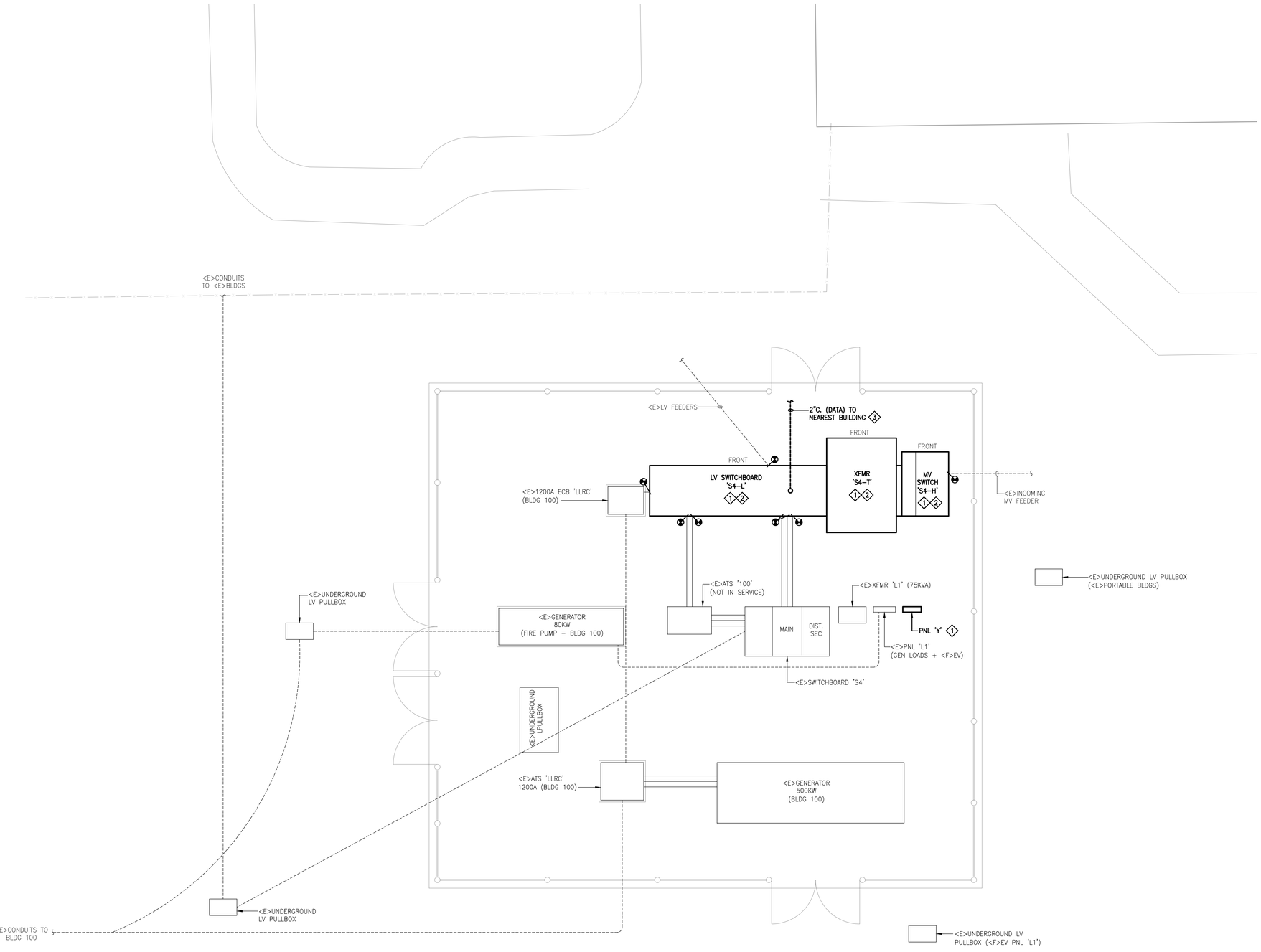
CHECKED BY:	MM
APPROVED BY:	HK

SHEET TITLE

ELECTRICAL
SUBSTATION #4 PLAN
DEMO

SCALE: AS NOTED
THIS DRAWING IS 30" X 42" AT FULL SIZE

ED-4.3.1
SHEET OF XX



1 **SUBSTATION #4 PLAN - NEW**
SCALE: 1/4" = 1' - 0"

0 4' 8'

N

REFERENCE SHEET NOTES

1. DESIGN, PROVIDE, AND INSTALL FOLLOWING EQUIPMENT:
   - <N> MV SWITCH 'S4-H'
   - <N> XFMR 'S4-T'
   - <N> LV SWITCHBOARD 'S4-L'
   - <N> PANEL 'Y' ALONG WITH INCOMING FEEDER

   REFER TO SINGLE LINE DIAGRAM FOR ADDITIONAL INFORMATION.

   TRANSFORMER TO BE FROM ZETRAK S.A. DE C.V.:
   CONTACT POWERSYSTEMS GROUP, LLC.
   +1 (682) 307-7380
   EMAIL: robertr@pwrsystemsgroup.com
2. DESIGN, PROVIDE, AND INSTALL NEW GROUNDING SYSTEM AS PER NEC - ARTICLE 250.
3. DESIGN, PROVIDE, AND INSTALL (1) 2" CONDUIT, FOR DATA SYSTEM, TO NEAREST BUILDING. PROVIDE CONNECTION BETWEEN POWER METER AND COLLEGE NETWORK.

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877.725.2755 | 877.925.1477 (f)
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Local Action.

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FAIRFIELD, CA 94534

SUBSTATION #3 & #4 REPLACEMENT

DSA APPL #XX-XXXXXX

ISSUE MARK	DATE	DESCRIPTION
	08/16/22	D&B BRIDGING DRAWING SET

SOBE PROJECT NO:	2200690
DATE:	08/15/22
DRAWN BY:	
CHECKED BY:	MM
APPROVED BY:	HK

SHEET TITLE

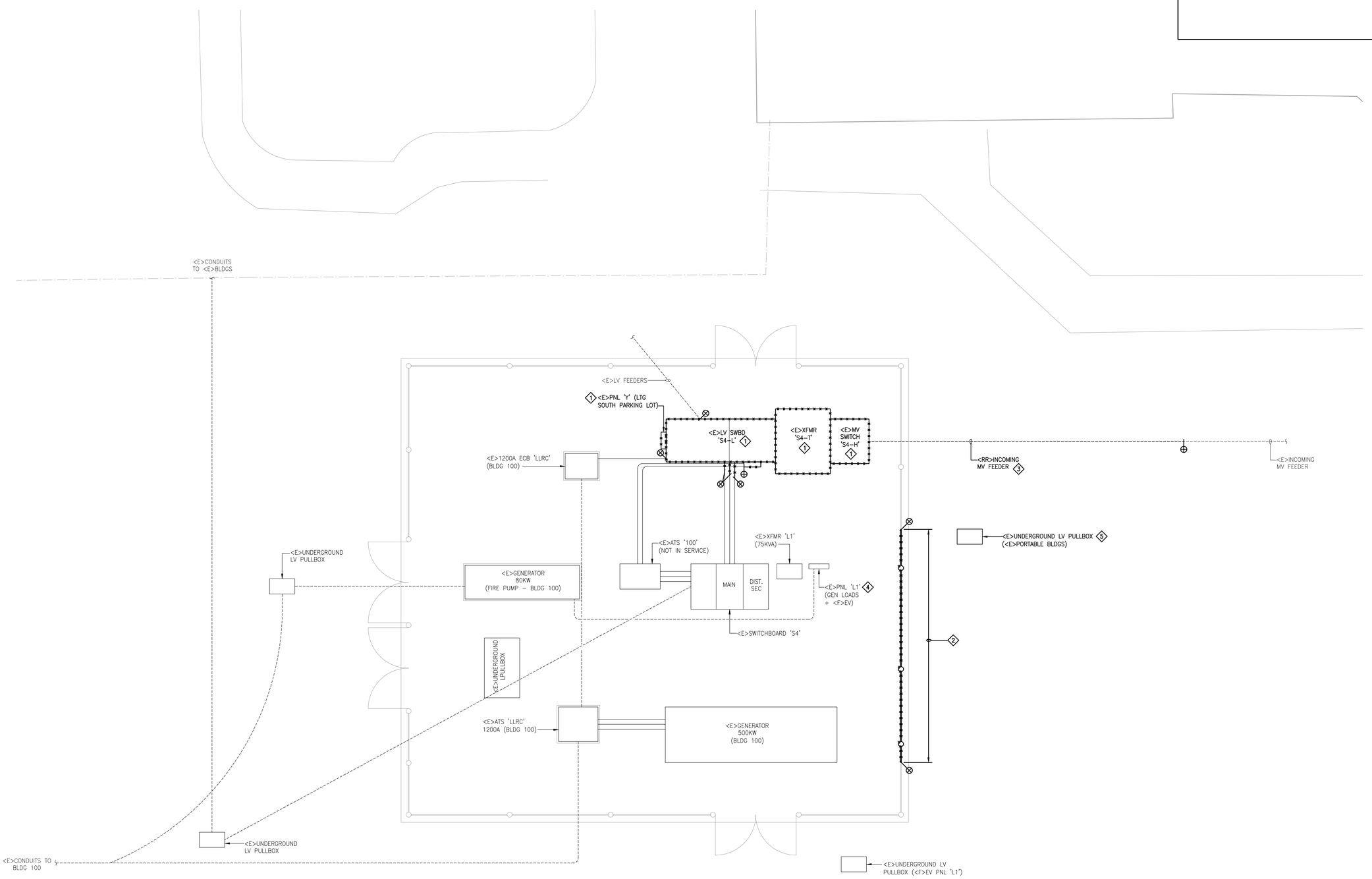
ELECTRICAL
SUBSTATION #4 PLAN
NEW

SCALE: AS NOTED
THIS DRAWING IS 30" X 42" AT FULL SIZE

E-4.3.1
SHEET OF XX

REFERENCE SHEET NOTES

1. REMOVE FOLLOWING EQUIPMENT:
   - <E> MV SWITCH 'S4-H'
   - <E> XFMR 'S4-T'
   - <E> LV SWITCHBOARD 'S4-L'
   - <E> PANEL 'Y' ALONG WITH INCOMING FEEDER
2. REMOVE EXISTING FENCE AS NECESSARY.
3. REROUTE EXISTING MV FEEDER TO NEW MV SWITCH LOCATION AS NECESSARY.
4. FIELD VERIFY EXISTING CONDUIT AND FEEDER ROUTING FOR EV CHARGERS. MODIFY / REPAIR EXISTING CONDUIT AND FEEDER FOR EV CHARGERS IF NECESSARY.
5. RELOCATE EXISTING UNDERGROUND LV PULL BOX IF NECESSARY. MODIFY / EXTEND EXISTING LV FEEDERS AS NECESSARY.



1 SUBSTATION #4 PLAN (OPTION 2) - DEMO
SCALE: 1/4" = 1' - 0"

0 4' 8'

N

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SUBSTATION #3 & #4 REPLACEMENT

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DATE:	08/15/22
DRAWN BY:	
CHECKED BY:	MM
APPROVED BY:	HK

SHEET TITLE

ELECTRICAL SUBSTATION #4 PLAN (OPTION 2) - DEMO

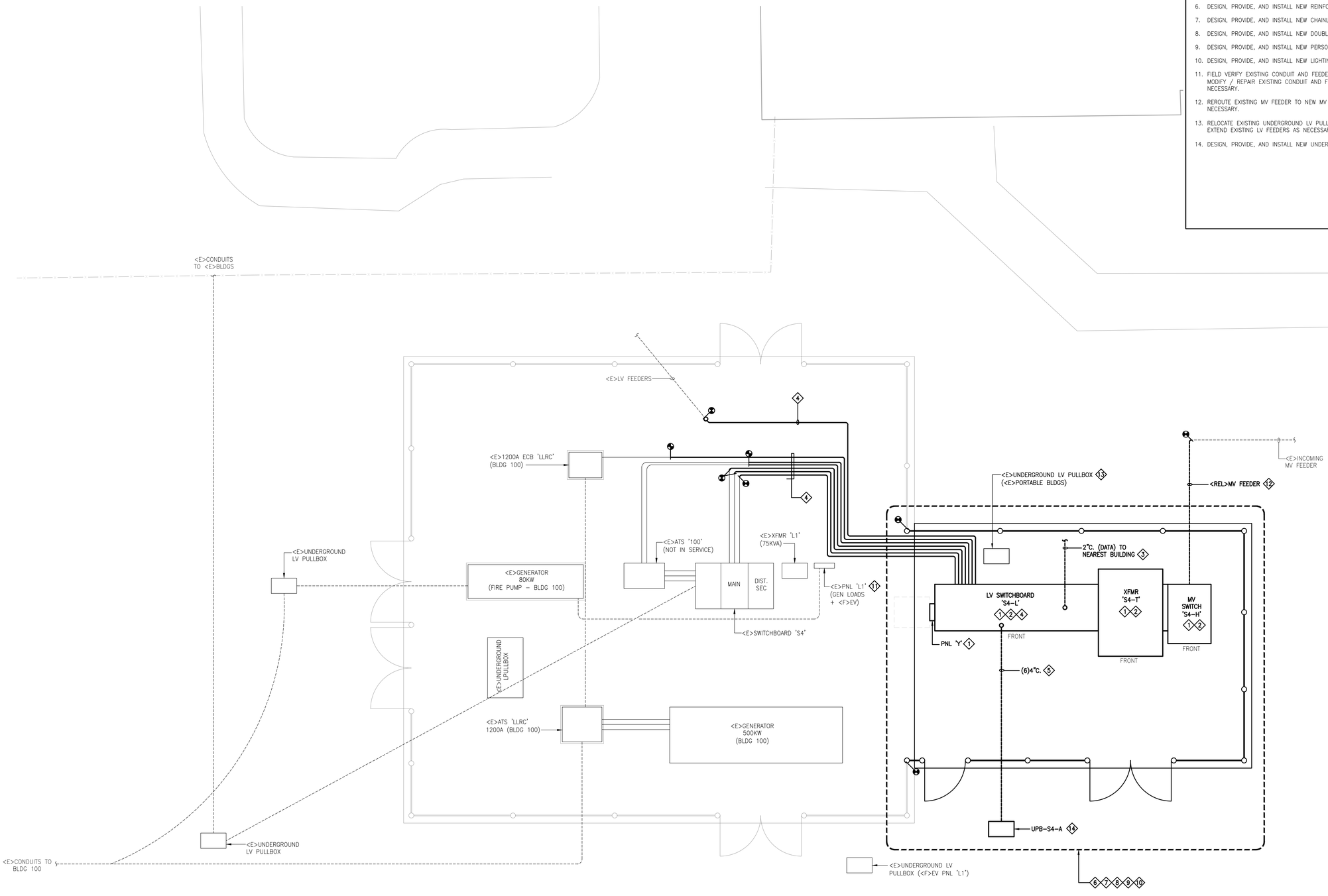
SCALE: AS NOTED
THIS DRAWING IS 30" X 42" AT FULL SIZE

ED-4.3.2
SHEET OF XX

REFERENCE SHEET NOTES

1. DESIGN, PROVIDE, AND INSTALL FOLLOWING EQUIPMENT:
   – <N> MV SWITCH 'S4–H'
   – <N> XFMR 'S4–T'
   – <N> LV SWITCHBOARD 'S4–L'
   – <N> PANEL 'Y' ALONG WITH INCOMING FEEDER
   REFER TO SINGLE LINE DIAGRAM FOR ADDITIONAL INFORMATION.

   TRANSFORMER TO BE FROM ZETRAK S.A. DE C.V.:
   CONTACT POWERSYSTEMS GROUP, LLC.
   +1 (682) 307–7380
   EMAIL: robertr@pwrsystemsgroup.com
2. DESIGN, PROVIDE, AND INSTALL NEW GROUNDING SYSTEM AS PER NEC – ARTICLE 250.
3. DESIGN, PROVIDE, AND INSTALL (1) 2" CONDUIT, FOR DATA SYSTEM, TO NEAREST BUILDING. PROVIDE CONNECTION BETWEEN POWER METER AND COLLEGE NETWORK.
4. EXTEND EXISTING LV FEEDERS TO NEW LV SWITCHBOARD 'S4–L'. REFER TO SINGLE LINE DIAGRAM FOR DETAILS.
5. DESIGN, PROVIDE, AND INSTALL (6) 4" CONDUITS (FOR FUTURE BREAKERS) FROM NEW LV SWITCHBOARD 'S4–L' TO NEW UNDERGROUND PULLBOX 'UPB–S4–A'.
6. DESIGN, PROVIDE, AND INSTALL NEW REINFORCED CONCRETE PAD.
7. DESIGN, PROVIDE, AND INSTALL NEW CHAINLINK FENCE WITH SLATS.
8. DESIGN, PROVIDE, AND INSTALL NEW DOUBLE–DOOR GATE.
9. DESIGN, PROVIDE, AND INSTALL NEW PERSONNEL GATE.
10. DESIGN, PROVIDE, AND INSTALL NEW LIGHTING SYSTEM.
11. FIELD VERIFY EXISTING CONDUIT AND FEEDER ROUTING FOR EV CHARGERS. MODIFY / REPAIR EXISTING CONDUIT AND FEEDER FOR EV CHARGERS IF NECESSARY.
12. REROUTE EXISTING MV FEEDER TO NEW MV SWITCH LOCATION AS NECESSARY.
13. RELOCATE EXISTING UNDERGROUND LV PULL BOX IF NECESSARY. MODIFY / EXTEND EXISTING LV FEEDERS AS NECESSARY.
14. DESIGN, PROVIDE, AND INSTALL NEW UNDERGROUND PULL BOX 'UPB–S4–A'.



1 SUBSTATION #4 PLAN (OPTION 2) – NEW

SCALE: 1/4" = 1' – 0"

0 4' 8'

N

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SHEET TITLE

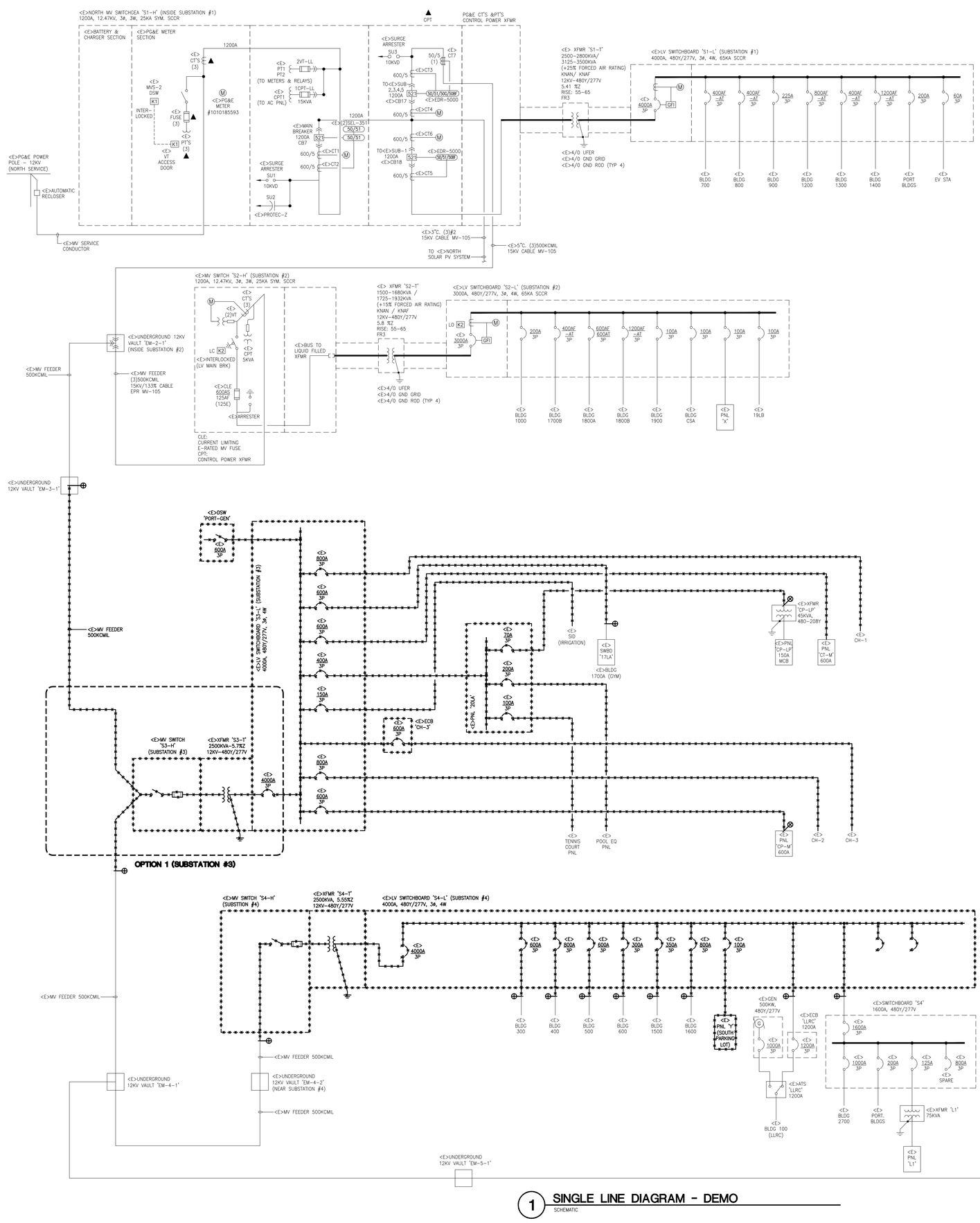
ELECTRICAL SUBSTATION #4 PLAN (OPTION 2) – NEW

SCALE: AS NOTED

THIS DRAWING IS 30" X 42" AT FULL SIZE

E-4.3.2

SHEET OF XX



1 SINGLE LINE DIAGRAM - DEMO
SCHEMATIC

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SUBSTATION #3 & #4 REPLACEMENT

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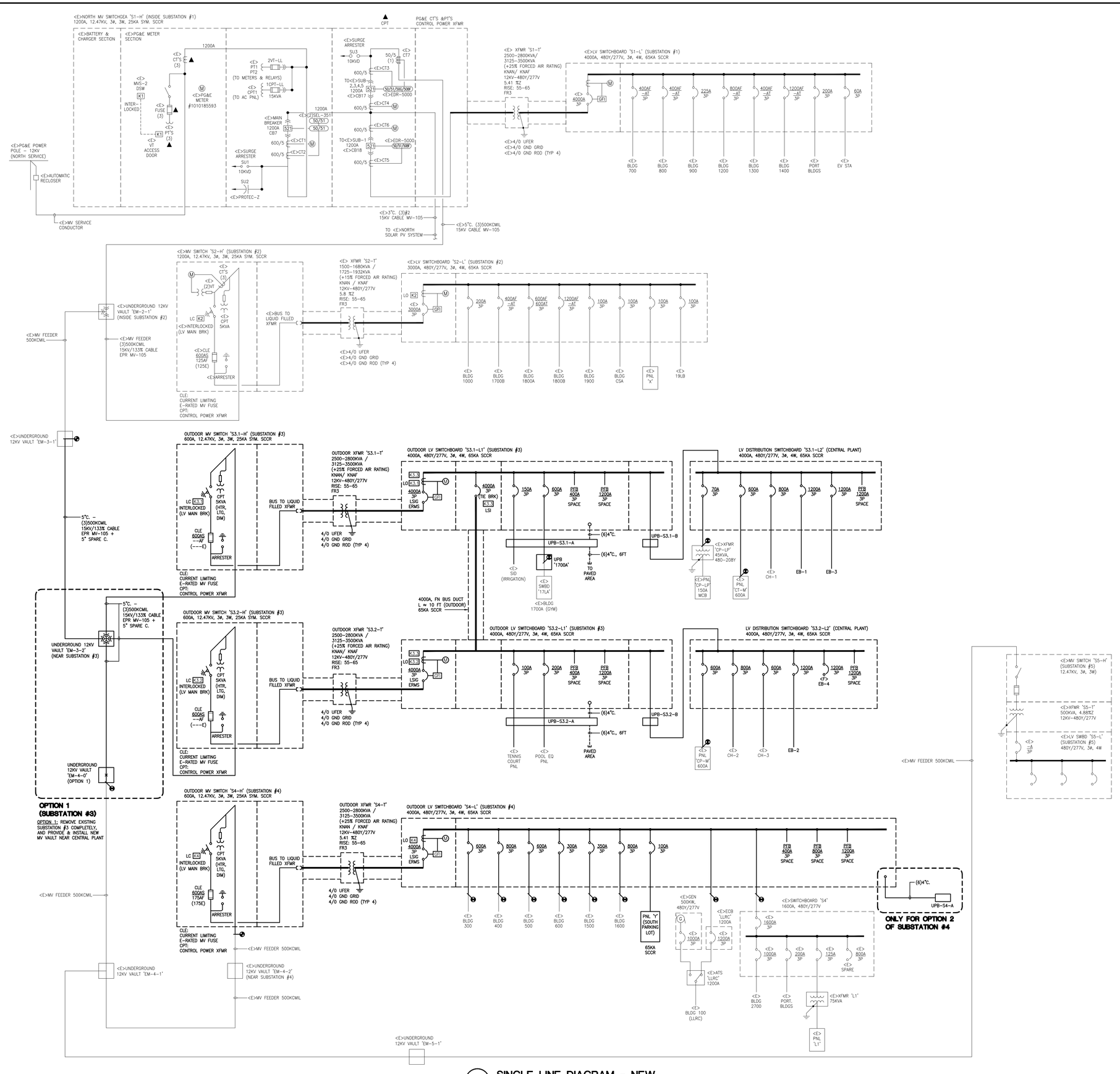
SHEET TITLE
ELECTRICAL SINGLE LINE DIAGRAM DEMO

SCALE: AS NOTED
THIS DRAWING IS 30" X 42" AT FULL SIZE

ED-7.1
SHEET OF XX



1 SINGLE LINE DIAGRAM - NEW
SCHEMATIC

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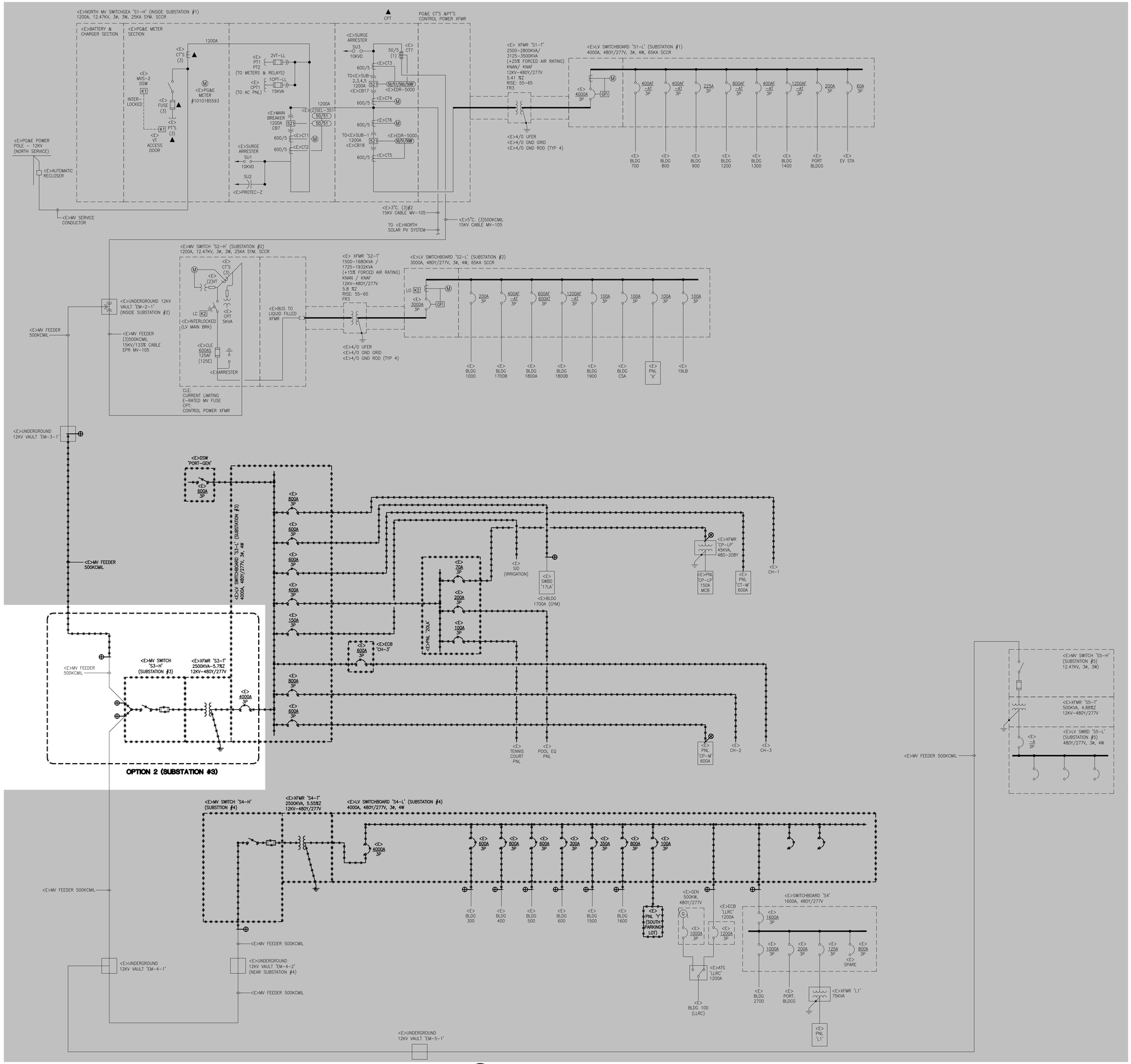
SHEET TITLE
ELECTRICAL SINGLE LINE DIAGRAM NEW

SCALE: AS NOTED
THIS DRAWING IS 30" X 42" AT FULL SIZE

E-7.1
SHEET OF XX

THIS DRAWING IS 30" X 42" AT FULL SIZE, 15" X 21" AT HALF SIZE. © 2015 BY SALAS O'BRIEN ENGINEERS, INC.



1 SINGLE LINE DIAGRAM - DEMO (SUBSTATION #3 - OPTION 2)

SCHEMATIC

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APPROVED BY:	HK

SHEET TITLE

ELECTRICAL
SINGLE LINE DIAGRAM - DEMO (SUBSTATION #3 - OPTION 2)

SCALE: AS NOTED
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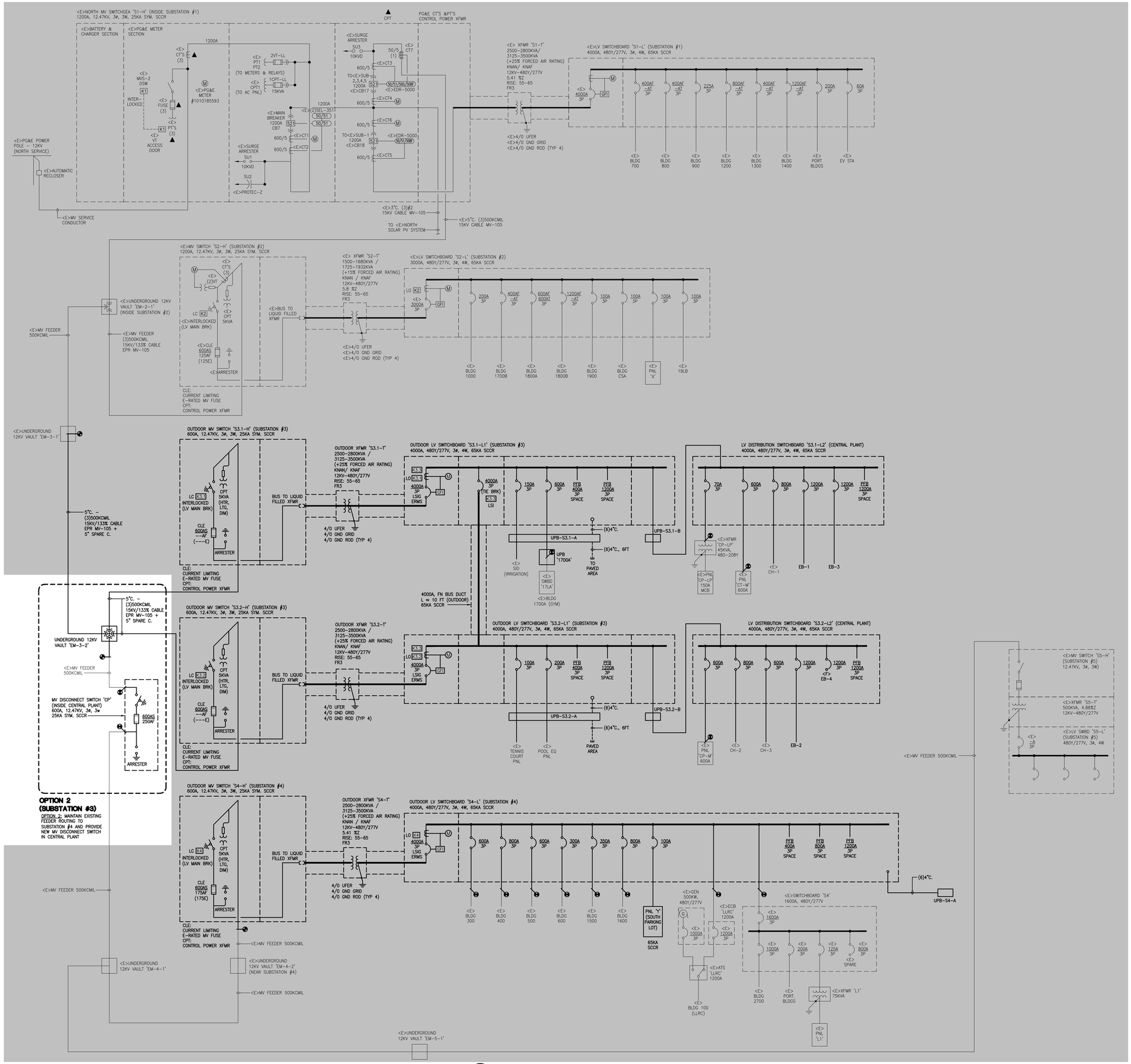
ED-7.2

SHEET OF XX



1 SINGLE LINE DIAGRAM - NEW (SUBSTATION #3 - OPTION 2)

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ELECTRICAL SINGLE LINE DIAGRAM - NEW (SUBSTATION #3 - OPTION 2)

SCALE: AS NOTED

THIS DRAWING IS 30" X 42" AT FULL SIZE

E-7.2

SHEET OF XX

DESIGN-BUILD PROJECT:

SUBSTATION #3 & #4 REPLACEMENT PROJECT

BY AND BETWEEN

SOLANO COMMUNITY COLLEGE DISTRICT

AND

[DESIGN BUILD ENTITY]

Dated as of _____, 2022

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DESIGN-BUILD AGREEMENT

This design-build agreement ("Agreement"), dated as of _____, 2022 ("Effective Date"), is made and entered into by and between [NAME OF DBE] ("DBE"), a [ENTITY TYPE] duly organized and existing under the laws of the State of [California], and Solano Community College District, a community college district duly organized and validly existing under the laws of the State of California (each a "Party" and, together, "Parties").

RECITALS

WHEREAS, the District is authorized under Education Code section 81700 et seq. to contract for the design and construction of community college facility projects in excess of $2.5 million using a design-build project delivery method;

WHEREAS, the District wishes to provide for the design and construction of certain work to be known as Substation #3 & #4 Replacement Project ("Project"), located at the Fairfield Campus, 4000 Suisun Valley Road, Building 1102, Fairfield, CA 94534 ("Site");

WHEREAS, the District retained Salas O'Brien ("Criteria Architect") to prepare documents setting forth the criteria for the Project (the "Criteria Documents"), which may establish, without limitation, the size, type, and desired design character of the Project, performance specifications covering the quality of materials, equipment, workmanship, and preliminary plans or building layouts;

WHEREAS, it is the intent of this Agreement that the DBE assume full responsibility for administering, managing, designing, constructing, and commissioning the Project to the requirements established by the Criteria Documents;

WHEREAS, the members of DBE are [INSERT MEMBERS], and represent that they are able to provide appropriately licensed contracting, architectural, and engineering services, as needed, pursuant to this Agreement;

WHEREAS, the DBE was selected for the Project based on a fair and impartial competitive selection process, in accordance with Education Code section 81700 et seq.

WHEREAS, the Governing Board of the District ("Board") has determined that DBE's proposal offered the best value to the public, in accordance with the District's best value selection methodology;

WHEREAS, DBE has reviewed the Agreement; and

WHEREAS, DBE represents that it has the expertise and experience to perform the services set forth in this Agreement;

WHEREAS, the Parties acknowledge that the District is in the process of updating its California Environmental Quality Act ("CEQA") compliance and that there may be changes resulting therefrom; and

WHEREAS, the Parties have performed all other acts, conditions and things required by law to exist, to have happened and to have been performed precedent to and in connection with the execution and entering into of this Agreement and all those conditions precedent do exist, have happened and have been performed in regular and due time, form

and manner as required by law, and the Parties hereto are now duly authorized to execute and enter into this Agreement; and

NOW, THEREFORE, in consideration of the above recitals and of the mutual covenants hereinafter contained, the Parties hereto do hereby agree as follows:

1. DEFINITIONS

In addition to the terms and entities defined above or in subsequent provisions, and unless the context otherwise requires, the terms defined in this section shall, for all purposes of this Agreement, have the meanings herein specified.

1.1 Adverse Weather: Shall be only weather that satisfies all of the following conditions: (1) unusually severe precipitation, sleet, snow, hail, or extreme temperature conditions in excess of the norm for the location and time of year it occurred based on the closest weather station data averaged over the past five years, (2) that is unanticipated and would cause unsafe work conditions and/or is unsuitable for scheduled work that should not be performed during inclement weather (i.e., exterior finishes), and (3) at the Project.

1.2 Agreement: The agreement between the District and Design-Build Entity contained in the Contract Documents.

1.3 Approval, Approved, and/or Accepted: Written authorization, unless stated otherwise.

1.4 Architect of Record: [NAME OF ARCHITECT], who is licensed in the State of California and employed or contracted as a member of DBE to design and prepare Construction Documents for the Project and to provide Construction Phase services during the Project. The Architect of Record is the Design Professional in General Responsible Charge as defined by the DSA. The Architect of Record is considered a member of the DBE and not a Subcontractor to the DBE for the purpose of this Contract.

1.5 As-Builts: Reproducible blue line prints of drawings to be prepared on a monthly basis pursuant to the Contract Documents, that reflect changes made during the performance of the Work, recording differences between the original design of the Work and the Work as constructed since the preceding monthly submittal. See Record Drawings.

1.6 Authorized Representatives: District's Representative(s) as communicated to the DBE.

1.7 Beneficial Occupancy: District's occupancy or use of any completed or partially completed portion of the Work.

1.8 Board: The Governing Board of the Solano Community College District.

1.9 Criteria Architect: Salas O'Brien, the architect retained by the District to develop the Criteria Documents and define functional, performance and aesthetic characteristics establishing the design intent for the Project.

1.10 Criteria Documents: the Design Requirements, Specifications, and the Drawings prepared by the District's Criteria Architect and incorporated by reference into the Agreement.

1.11 Change Order: a change to the Agreement and/or Contract Documents signed by the DBE and the District authorizing a change in the Work, which may also adjust the GMP and/or the Contract Time. The GMP and/or Contract Time may be changed only by Change Order.

1.12 Change Proposal: a proposal for a Change Order, submitted by the DBE at the request of the District, or by the DBE's own initiative.

1.13 Commissioning: a quality assurance process for achieving, validating and documenting that the new facility and its systems are planned, designed, installed, tested and capable of being operable and maintained to perform in conformity with the Criteria Documents.

1.14 Completion: The earliest of the date of acceptance by the District or the cessation of labor thereon for a continuous period of sixty (60) days.

1.14.1 Substantial Completion: The date at which (i) such Work can be fully enjoyed and beneficially occupied and utilized by District for its intended purpose (except for minor items which do not impair District's ability to occupy and use such Work); (ii) any permits, approvals and certificates by governmental authorities required to occupy and use such Work have been issued; and (iii) all systems included in such Work are installed and operational as specified, all designated or required inspections and certifications by governmental authorities have been made and posted, and instructions of District's personnel in the operation of such systems has been completed.

1.14.2 Final Completion: The point at which the Work has been completed in accordance with the terms and conditions of the Contract Documents.

1.15 Construction Documents: the drawings and specifications prepared and sealed by the Architect of Record on behalf of the DBE for construction of the Project.

1.16 Construction Manager: The individual, partnership, corporation, joint venture, or any combination thereof, or its authorized representative, named as such by the District. If no Construction Manager is used on the Project that is the subject of this Agreement, then all references to Construction Manager herein shall be read to refer to District.

1.17 Contract Documents: The Contract Documents consist exclusively of the documents evidencing the agreement of the District and DBE. The Contract Documents consist of the following documents:

1.17.1 Non-Collusion Declaration

1.17.2 Iran Contracting Act Certification

1.17.3 Design-Build Agreement

1.17.4 Performance Bond

1.17.5 Payment Bond (DBE's Labor & Material Bond)

1.17.6 Registered Subcontractors List

1.17.7 Hazardous Materials Procedures and Requirements

1.17.8 Workers' Compensation Certification

1.17.9 Prevailing Wage Certification

1.17.10 Disabled Veterans Business Enterprise Participation Certification (if applicable)

1.17.11 Drug-Free Workplace Certification

1.17.12 Tobacco-Free Environment Certification

1.17.13 COVID-19 Vaccination/Testing Certification

1.17.14 Hazardous Materials Certification

1.17.15 Lead-Based Materials Certification (if applicable)

1.17.16 Imported Materials Certification (if applicable)

1.17.17 Roofing Project Certification (if applicable)

1.17.18 Escrow Agreement for Security Deposits in Lieu of Retention (if used)

1.17.19 Guarantee Form

1.17.20 Agreement and Release of Any and All Claims

1.17.21 All Plans, Technical Specifications, and Drawings

1.17.22 Any and all addenda to any of the above documents

1.17.23 Any and all change orders or written modifications to the above documents if approved in writing by the District.

1.18 Contract Time: The time stated in the Agreement for the completion of the Work.

1.19 Day(s): calendar day(s), unless otherwise specifically designated as a business or working day(s). If a day requiring notice or action falls on a weekend or national or state holiday, then the next non-weekend or non-holiday shall be applicable. Business day(s) are days other than weekend days or federal or state holidays.

1.20 Design-Builder Entity ("DBE"): [NAME OF DBE], a [INSERT ENTITY TYPE] able to provide appropriately licensed construction contracting, and professional architectural and engineering services required hereunder.

1.21 District: The community college district for which the Work is performed. The governing board of the District or its designees will act for the District in all matters pertaining to the Agreement. The District may, at any time:

1.21.1 Direct the DBE to communicate with or provide notice to the Construction Manager or the Criteria Architect on matters for which the Contract Documents indicate the DBE will communicate with or provide notice to the District; and/or

1.21.2 Direct the Construction Manager or the Criteria Architect to communicate with or direct the DBE on matters for which the Contract Documents indicate the District will communicate with or direct the DBE.

1.22 DSA: Division of the State Architect.

1.23 Encumbered: The labor rate for Contractor or any Subcontractor inclusive of any and all burden costs including, but not limited to, health and welfare pay, vacation and holiday pay, pension contributions, training rates, benefits of any kind, insurance of any kind, workers' compensation, liability insurance, truck expenses, supply expenses of any kind, payroll taxes, and any other taxes of any kind.

1.24 Guaranteed Maximum Price (or GMP): The price established as the maximum compensation to DBE for the design and construction of the Project. The GMP includes the Initial GMP and the Final GMP.

1.24.1 Initial GMP: The Parties shall establish the Initial GMP by Contract amendment at the end of the Schematic Design Milestone.

1.24.2 Final GMP: The Parties shall establish the Final GMP, which shall supersede and replace the Initial GMP, by Contract amendment at the end of the 50% Design Development Milestone.

1.25 General Conditions: Requirements in this document which set forth the general terms and conditions governing performance of the Work.

1.26 General Requirements: Requirements in the portion of the Specifications so titled setting forth additional requirements for administration of the Work.

1.27 Job Cost Reports: Any and all reports or records detailing the costs associated with work performed on or related to the Project that DBE shall maintain for the Project. Specifically, Job Cost Reports shall contain, but are not limited by or to, the following information: a description of the work performed or to be performed on the Project; quantity, if applicable, of work performed (hours, square feet, cubic yards, pounds, etc.) for the Project; Project budget; costs for the Project to date; estimated costs to complete the Project; and expected costs at completion. The Job Cost Reports shall also reflect all Contract cost codes, change orders, elements of non-conforming work, back charges, and additional services.

1.28 Notice to Proceed with Design: the notice given by the District to the DBE stating that the DBE is authorized to commence design of the Project.

1.29 Notice to Proceed with Construction: the notice given by the District to the DBE, following completion of the Design Phase and approval of the plans by the Division of the State Architect, stating that the DBE is authorized to commence construction of the Project.

1.30 Program Manager: The individual, partnership, corporation, joint venture, or any combination thereof, or its authorized representative, named as such by the District. If no Program Manager is designated for the Project that is the subject of the Contract Documents, then all references to Program Manager herein shall be read to refer to District.

1.31 Project: The planned undertaking as provided for in the Contract Documents.

1.32 Project Inspector: The individual(s) retained by the District in accordance with title 24 of the California Code of Regulations to monitor and inspect the Project.

1.33 Project Labor Agreement (or PLA): A prehire collective bargaining agreement in accordance with Public Contract Code section 2500 et seq. that establishes terms and conditions of employment for a specific construction project or projects and/or is an agreement described in Section 158(f) of Title 29 of the United States Code. A copy of the PLA applicable to this project is included in **Attachment D**.

1.34 Proposed Change Order: A Proposed Change Order ("PCO") is a written request prepared by the DBE requesting that the District, the Construction Manager and the Criteria Architect issue a Change Order based upon a proposed change to the Work.

1.35 Site: The Project site as shown on the Drawings.

1.36 Subcontractor: A contractor and/or supplier who is under contract with the DBE or with any other subcontractor, regardless of tier, to perform a portion of the Work of the Project.

1.37 Surety: The person, firm, or corporation that executes as surety the DBE's Performance Bond and Payment Bond, and must be a California admitted surety insurer as defined in the Code of Civil Procedure section 995.120.

1.38 Unforeseen Conditions: Concealed physical conditions at the site with an adverse impact on the Work or schedule that are materially different from those conditions (i) indicated in or reasonably inferred from the Contract Documents and (ii) ordinarily found to exist and generally recognized in construction activities of the type required by the Contract Documents

1.39 Work: All labor, materials, equipment, components, appliances, supervision, coordination, and services required by, or reasonably inferred from, the Contract Documents, that are necessary for the construction and completion of the Project.

2. GENERAL PROVISIONS

2.1 Scope of Work

2.1.1 The DBE shall be responsible for the performance of all design and construction services, and provide all materials, labor, tools, and equipment necessary to complete, in a good and workmanlike manner, the Work described in and reasonably inferable from the Contract Documents, in accordance with the Criteria Documents, attached hereto as **APPENDIX B**, for the GMP.

2.1.2 DBE shall be responsible for achieving the Milestones Dates in the Project Milestone Schedule as shown in the RFQP Schedule Summary. The Project Milestone Schedule may only be modified pursuant to the provisions of the Contract Documents.

2.1.3 Except as otherwise noted, DBE shall provide and pay for all labor, materials, equipment, permits (excluding DSA), fees, licenses, facilities, transportation, taxes, bonds and insurance, and services necessary for the proper execution and completion of the Work.

2.2 Status of DBE

2.2.1 DBE is and shall at all times be deemed to be an independent contractor and shall be wholly responsible for the manner in which it and its Subcontractors perform the services required of it by the Contract Documents. Nothing herein contained shall be construed as creating the relationship of employer and employee, or principal and agent, between the District, or any of the District's employees or agents, and DBE or any of DBE's Subcontractors, agents or employees. DBE assumes exclusively the responsibility for the acts of its agents and employees as they relate to the services to be provided during the course and scope of their employment. DBE, its Subcontractors, and its agents and employees shall not be entitled to any rights or privileges of District employees. District shall be permitted to monitor the DBE's activities to determine compliance with the terms of the Contract Documents.

2.2.2 As required by law, DBE and all Subcontractors shall be properly licensed and regulated by the Contractors State License Board.

2.2.3 As required by law, DBE and all Subcontractors shall be properly registered as public works contractors by the Department of Industrial Relations.

2.2.4 DBE represents that it has no existing interest and will not acquire any interest, direct or indirect, which could conflict in any manner or degree with the performance of Work required under this Agreement and that no person having any such interest shall be employed by DBE.

2.3 Execution, Correlation and Intent

2.3.1 The Agreement will not be binding on the District until approved by the District's Board.

2.3.2 Execution of the Agreement by DBE is a representation that the DBE has the expertise and experience for and understands and accepts the methodology under which the Work is to be performed and the requirements of the Contract Documents.

2.3.3 The intent of the Contract Documents is to include all necessary criteria to establish the scope, quality and performance requirements for completion of the Work by DBE. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all.

2.3.4 Unless otherwise stated in the Contract Documents, words and phrases shall be interpreted consistent with construction and design industry standards for California community college districts.

2.3.5 Work shall be in compliance with applicable laws, codes, ordinances and regulations, including but not limited to Title 24 of the California Code of Regulations. Higher levels of performance, material, and or function, may be required or reasonably inferred from the Contract Documents.

2.4 Conflicts in the Contract Documents

2.4.1 The Contract Documents are intended to be complementary and interpreted in harmony so as to avoid conflict. However, if DBE observes any conflict in the Contract Documents, DBE shall promptly notify District and Program Manager in writing. In the event of conflict in the Contract Documents, the precedence shall be as follows:

2.4.1.1 Addenda shall govern over other sections of the Contract Documents to the extent specifically noted; subsequent Addenda shall govern over prior Addenda only to the extent specified.

2.4.1.2 The Agreement shall govern over other Contract Documents except for specific modifications stated in amendments to the Agreement and Addenda.

2.4.1.3 In case of conflict between the Criteria Document drawings, Technical Specification Sections 2-49, and the Division 0 and 1 Specifications, the DBE shall obtain written clarification from the District as to the governing document.

2.4.1.4 In the case of conflict within the Criteria Document drawings, the following shall govern:

2.4.1.4.1 Schedules, when identified as such, shall govern over all other portions of the drawings.

2.4.1.4.2 Specific notes shall govern over all other notes and all other portions of the drawings, except schedules described in the preceding sub clause.

2.4.1.4.3 Larger scale drawings shall govern over smaller scale drawings.

2.4.1.4.4 Figured or numerical dimensions shall govern over dimensions obtained by scaling.

2.4.1.4.5 In the case of other conflict within the drawings, the DBE shall obtain written clarification from the District as to the governing document.

2.4.2 The District and DBE acknowledge that the Contract Documents may differ in some respects from other documents upon which DBE based its proposal. The District and DBE agree that the Contract Documents shall supersede any prior or inconsistent versions.

2.5 Clarifications and Additional Instructions

2.5.1 Conflicts, omissions, errors, interpretation or clarification, insufficiency of detail or explanation in the Contract Documents relative to the timely or material execution of the Work shall be immediately brought to the attention of the District in writing to request interpretation, clarification, or furnishing of additional detailed instructions. Such questions shall be resolved and instructions to the DBE issued within a reasonable time by the District. The District's decision shall be final and conclusive. Should the DBE proceed with the work before receipt of instructions from the District, the DBE shall make adjustments to conform to the District's instructions and DBE shall be solely responsible for any resultant damage, defect or added costs.

2.5.2 The District may furnish additional written instructions to explain the work more fully, and such instructions shall become, upon issuance, a part of the Contract Documents requirements. Should additional instructions, in the opinion of the DBE, constitute work in excess of the scope of the Work, the DBE shall submit written notice to the District within ten (10) calendar days following receipt of such instructions, and in any event prior to commencement of the work on that scope of work. After considering the notice, and if justified in the District's judgment, the District will authorize the extra work.

3. DBE'S DUTIES AND RESPONSIBILITIES: DESIGN

3.1 Design Phase Responsibilities

3.1.1 The Design Phase includes the preparation of the design and Construction Documents for the Project including, but not limited, to all necessary architectural design, specialty consultant services, civil engineering, structural engineering, mechanical engineering, plumbing and HVAC design, fire protection system engineering, landscape architecture, electrical engineering, security system design, telecommunications, data and low-voltage signaling design, geotechnical engineering, topographic and

boundary surveying, interior design, modular furniture systems and fixtures, furniture and equipment coordination and space planning, and acoustical engineering. The Design Phase shall also include all plan check and permitting activities required for the construction activities.

3.2 DBE's Responsibilities

3.2.1 DBE agrees to design and construct the Project in consideration for the District's payment up to the GMP, which may only be adjusted pursuant to the provisions of this Agreement.

3.2.2 General Responsibilities

3.2.2.1 Upon receipt of the Notice to Proceed with Design, the DBE shall instruct the Architect of Record to commence with the design of the building systems and the preparation of the Construction Documents. In accordance with the Criteria Documents, the Construction Documents shall provide information customarily necessary in documents for projects of similar size, complexity, and quality.

3.2.2.2 The Construction Documents shall include all information required by the building trades to complete the construction of the Project, other than such details customarily developed by others during construction. The DBE shall be responsible to design, prepare Construction Documents and coordinate all disciplines for the entire Project including, but not limited to: all structural elements, building enclosure, roofing, waterproofing, site work, public right-of-way improvements, new parking lots, hardscape, landscape, utilities, and all building systems.

3.2.2.3 Responsibilities also include all design coordination necessary for accommodation of interior space construction, modular furniture coordination, finishes, furnishings, fixtures and equipment, and related infrastructure. The Project's design shall meet or exceed the design and performance criteria stipulated in the Criteria Documents.

3.2.2.4 Deliver to the District any and all design materials. These materials include, but are not limited to: calculations, preliminary drawings, construction drawings, shop drawings, samples, electronic media data, tenant improvement documents, sketches, illustrations, specifications, descriptions, models, mock-ups, and other information developed, prepared, furnished, or delivered in the prosecution of the design work.

3.2.2.5 Design Confirmation Phase

3.2.2.5.1 Following receipt of a Notice to Proceed with Design, the DBE shall meet at least weekly with District and provide such information as necessary to inform District of the Project design status, and obtain District input and approval regarding design issues. The DBE shall be responsible for

scheduling and coordinating the participation in these meetings. DBE's documents shall depict the materials, equipment, design, layout and general coordination of each major building system (i.e.: structural, exterior closure, mechanical, plumbing, electrical, etc.) in sufficient detail to confirm compliance with the Criteria Documents.

3.2.2.5.2 Conduct value engineering analysis on building components to determine best value based on initial cost, life expectancy, cost of operation and maintenance. The value engineering analysis shall be performed concurrent with the Design Confirmation effort.

3.2.2.5.3 Prepare and update at each document submittal milestone detailed estimates of the cost of construction to substantiate that the Project will not exceed the GMP.

3.2.2.5.4 Prepare and update monthly the detailed construction schedule to confirm Project delivery within the Milestone Dates.

3.2.2.5.5 Provide services to develop a final space program and prepare plan layouts to reflect the requirements of all tenant departments.

3.2.2.6 Construction Documents Phase

3.2.2.6.1 Prepare Construction Documents for the entire Project, in full compliance with all applicable laws, building codes, ordinances, and other requirements by regulatory authorities. The completed Construction Documents are to be delivered to the District and shall consist of the following:

3.2.2.6.1.1 Drawings. Provide one reproducible original, and ten (10) printed copies of all approved construction document drawings. Provide one copy of all approved construction document drawings on compact discs (CD) using Computer-Aided Design (CAD) software, using AutoCAD 2010.

3.2.2.6.1.2 Specifications. Provide original and ten (10) printed copies of approved specifications, bound and organized. Provide approved specifications on CDs for all sections for all work applicable to the Project, using a format that complies with the current edition of the Construction Specifications Institute's "Master Format" as directed by the District and in accordance with the following:

3.2.2.6.1.2.1 Electronic computer software in Microsoft Word, latest version for Windows.

3.2.2.6.1.2.2 Where articles, materials, and equipment are identified by brand names, at least two brand names shall be specified, and shall be followed by the words "or equal". Specifications shall not contain restrictions that will limit competitive bids. Exceptions shall only be as permitted by California Public Contract Code section 3400.

3.2.2.6.1.2.3 All CDs provided shall be indexed and clearly labeled to indicate files contained thereon and the date that the CD was produced. All electronic files shall use fonts and formats used by the District and the discs shall be formatted for easy printing.

3.2.2.6.1.3 Specifications shall not contain restrictions that will limit competitive bids. Where articles, materials, and equipment are identified by brand names, at least two brand names shall be specified, and shall be followed by the words "or equal". Exceptions shall only be as permitted by California Public Contract Code section 3400.

3.2.2.6.2 Review meetings between the DBE and the District to review the Construction Document packages shall be scheduled and held so as not to delay the Work. Such review shall not relieve the DBE from its responsibilities under the Contract. Such review shall not be deemed an approval or waiver by the District of any deviation from, or of the DBE's failure to comply with, any provision or requirement of the Contract Documents, unless such deviation or failure has been identified as such in writing in the document submitted by the DBE and approved in writing by the District.

3.2.2.6.3 The DBE shall submit completed packages of the Construction Documents, in the quantities required by the District to all applicable authorities having jurisdiction (including but not limited to DSA), at the times indicated on the DBE's Baseline Schedule. DBE is responsible for completing the designs and submitting them to DSA in a timely fashion in order to obtain DSA approval and complete all Work according to the Project Milestone Schedule. All Work is to be performed in accordance with the requirements of the DSA and the Design-Builder shall be solely responsible for obtaining all approvals from DSA at no additional cost to District.

3.2.2.7 Ownership of Design Materials

3.2.2.7.1 All materials and documents developed in the performance of this Agreement are the property of the District. The District shall have unlimited rights, for the benefit of the District, in all drawings, designs, specifications, notes, and other work developed in the performance of this Agreement, including the right to use same on any other District project at no additional cost to the District.

3.2.2.7.2 DBE agrees to and does grant to the District a royalty-free license to all such data that DBE may cover by copyright and to all designs as to which DBE may assert any rights or establish any claim under United States patent or copyright laws. The DBE for a period of three (3) years after completion of the Project agrees to furnish and to provide access to the originals or copies of all such materials upon the request of the District.

3.2.2.7.3 The District agrees to make no demand on DBE and indemnifies the DBE for any damages caused by the District's use of such materials for any other District project that is not the subject of an agreement between the District and DBE for such use.

3.2.2.7.4 The DBE shall perform the work required under this Agreement with Computer-Aided Design (CAD) software, using the latest version of Revit, and shall deliver to the District the CDs containing the electronic files of all approved Construction Document drawings, in both Revit and AutoCAD 2010 format As well as PDF format. The format of electronic documents delivered to the District will be determined in conjunction with the District in order to facilitate retrieval of information. During the Design and Construction Phases, DBE will utilize ProCore – licensing paid for by district – or an approved equal electronic document control system at cost to the DBE.

3.2.2.7.5 The District does not assume any obligation to retain the DBE's services or pay DBE royalties of any type as to future programs.

3.2.2.8 Design Errors

The DBE shall be solely responsible for all design errors and for correction of the same at no additional cost to District, including, but not limited to: errors, inconsistencies or omissions in the Construction Documents, and errors, omissions and inconsistencies that do not conform to the standards established in the Contract Documents and the Criteria Documents. The DBE shall take field measurements and verify field conditions and shall carefully compare such field conditions and other information known to the DBE from the Contract Documents and the Criteria Documents before commencing Design activities.

4. DBE'S DUTIES AND RESPONSIBILITIES: CONSTRUCTION

4.1 Construction Phase Design Responsibilities

4.1.1 The DBE shall provide modular buildings for use as a Project Field Office for both the DBE and the District's Project Management Team. The field office shall be available and fully operational for the District's Project Management Team no later than forty-five (45) calendar days after the date of execution of this Agreement, or by a date agreed to by the District, and shall be vacated in an "as found" condition within sixty (60) days after Completion.

4.1.2 All portions of the construction Work awarded by the DBE to a Subcontractor not listed in the DBE's proposal shall be awarded by the DBE in conformity with the requirements of California Education Code section 81704, subdivision (c), and the District's bidding procedures. All Subcontractors bidding on work to be awarded by the DBE shall be afforded the protections contained in Division 2, Part 1, Chapter 4 of the California Public Contract Code Section 4100 et seq. The DBE shall provide public notice of the availability of work to be subcontracted in accordance with state law applicable to the competitive bidding process and provide a fixed date and time on which the subcontracted work will be awarded. Any Subcontractor awarded a subcontract for this Project in this manner is then afforded the protections as set forth in California Public Contract Code Section 4107.

4.1.3 If a discovery is made of items of archaeological interest on site during excavation activities, the DBE shall immediately cease excavation in the area of discovery and shall not continue until directed by the District. DBE shall cooperate with and provide access to the archaeologist or the county coroner pursuant to California Health and Safety Code Section 7050.5.

4.2 Standards of Performance.

4.2.1 The Work on the Project shall be performed in accordance with the professional standards and quality of care applicable to projects, buildings or work of similar size, complexity, quality and scope constructed within a similar California environment.

4.2.2 The DBE has been selected to perform the Work herein because of the skills and expertise of key individuals. The DBE agrees that the following key people shall be utilized by DBE on the Project in the following capacities:

Principal In Charge: _____

Project Director: _____

Project Architect(s): _____

Project Architect(s): _____

Other: _____

Major Consultants:

Electrical: _____

Mechanical: _____

Structural: _____

Civil: _____

Other: _____

4.2.2.1 DBE shall not change any of the key personnel listed above without prior written approval by the District, unless said personnel cease to be employed by DBE. In either case, the District shall be allowed to interview and approve replacement personnel.

4.2.2.2 If any designated lead or key person fails to perform to the satisfaction of the District, then upon written notice DBE shall have five (5) calendar days to remove that person from the Project and replace that person with one acceptable to the District.

4.2.3 The DBE shall employ full-time, competent on-site Project management, including but not limited to the Project Manager or superintendent(s), who shall be in attendance at the Project Site during the construction of the Project. The Project Manager shall represent the DBE and communications given to and by the Project Manager shall be as binding as if given directly to and by the DBE. The DBE shall confirm all communications in writing.

4.2.4 At any time when the Project Manager is absent from the Project Site, either when work is being performed or when no work is being performed, the Project Manager, or his or her designated representative acceptable to the District, shall be readily reachable and available for consultation at the Project Site at any time.

4.2.5 Any persons that the District may deem incompetent or disorderly shall be promptly removed from the Project by the DBE upon written notice from the District, and shall not be reemployed for the duration of the Project.

4.3 Applicable Laws and Codes

4.3.1 The DBE shall comply with all applicable laws, codes, and ordinances and shall give notices as applicable. DBE shall prepare and file all documents required to obtain the necessary approvals of governmental authorities having jurisdiction over the work and shall secure and pay as part of the GMP, for all plan check and permits fees, licenses and inspections required, including any fees charged by DSA. Notwithstanding the foregoing, the DSA Project Inspector and the third-party special inspection and materials testing laboratory services will be paid for by the District.

4.3.2 DBE shall promptly notify the District, in writing, of variances observed between the Contract Documents and applicable laws. If no notice is provided to the District, the DBE shall bear responsibility for any costs for work performed known to be contrary to applicable laws.

4.3.3 DBE is subject to all laws, rules, or regulations pertaining to building permits or regulating the design or construction of buildings upon District property and shall be solely responsible for meeting these requirements.

4.4 Project Inspector

No Work shall be carried on except with the knowledge and under the inspection of the Project Inspector(s). The Project Inspector(s) shall have free access to any or all parts of Work at any time. DBE shall furnish Project Inspector(s) reasonable opportunities for obtaining such information as may be necessary to keep Project Inspector(s) fully informed respecting progress and manner of work and character of materials, including, but not limited to, submission of form DSA 156 (or the most current version) to the Project Inspector at least 48 hours in advance of the commencement and completion of construction of each and every aspect of the Work. Inspection of Work shall not relieve DBE from an obligation to fulfill this Agreement. Project Inspector(s) and the DSA are authorized to suspend work whenever the DBE and/or its Subcontractor(s) are not complying with the Contract Documents. Any work stoppage by the Project Inspector(s) and/or DSA shall be without liability to the District. DBE shall instruct its Subcontractors and employees accordingly.

4.5 Permits, Fees and Notices

4.5.1 Unless otherwise provided in the Contract Documents, the DBE shall be responsible for required permits, governmental fees, licenses, registrations, inspections, approvals, notices and actions necessary to complete the Work and to prepare all documents customarily required for regulatory agency approvals, including DSA. DBE shall be responsible for the cost of all permits, fees and licenses required for the proper execution and completion of the Work and such appropriate costs shall be included in the GMP.

4.5.2 DBE shall assume responsibility for all utility assessments and connection fees levied by all utility service providers. In addition, DBE shall coordinate all applications with the District to ensure the lowest cost, including utilizing any special rate structures available to the District.

4.6 Use of Project Site

4.6.1 DBE shall confine operations at the Project Site to areas permitted by law, ordinances, permits, and the Contract Documents.

4.6.2 DBE shall perform no operations of any nature on or beyond the limits of the Work or premises, except as such operations are authorized in the Contract Documents, or authorized by the District.

4.6.3 DBE shall provide and maintain a temporary construction fence and suitable temporary barriers to prevent public entry; protect the work and existing facilities, persons, trees and plants from damage or injury from construction operations, or trespassers. Temporary barriers shall be maintained in a structurally sound condition and neat appearance.

4.6.4 Should regulatory requirements necessitate construction of temporary barriers, barricades, or pedestrian walkways not indicated or specified, DBE shall construct such barriers at no increase to the GMP. If required, DBE will paint such items in a color selected by the District.

4.7 Cutting and Patching

4.7.1 DBE shall be responsible for all cutting, fitting or patching required to complete the Work.

4.7.2 DBE shall not damage or endanger the existing property or facilities, including but not limited to utilities, by cutting, patching or otherwise altering the construction, and shall not cut nor otherwise alter the construction without prior written consent of District.

4.8 Cleaning

4.8.1 DBE shall keep the Project Site safe and surrounding areas free from waste materials and/or rubbish caused by operations under the Agreement and at other times when directed by the District. At all times while finish work is in progress, floors shall be kept clean, free of dust, construction debris and trash. Prior to issuance of the Notice of Completion, DBE shall remove from the Project Site the DBE's tools, construction equipment, machinery, and any waste materials not previously disposed of, leaving the Project site thoroughly clean, and ready for District's final inspection.

4.8.2 If DBE fails to clean up as provided in the Contract Documents, the District may do so and the cost thereof deducted from the final payment due to DBE.

4.9 Site Availability

4.9.1 The District shall turn over the Site to the DBE at the time of Notice to Proceed with Construction, at which time the DBE shall be obligated to take control and responsibility. The DBE shall provide the District, Construction Manager and other District consultants with continuous access to the Site.

4.9.2 Temporary parking facilities shall meet all applicable regulatory requirements applicable to design and construction. DBE shall be responsible for all permits, design, and construction required including, but not limited to lighting, access, signage, handicap accessibility, and maintenance. At the end of the Project, all temporary parking and utilities shall be removed and those areas of the Project Site restored to its previous condition.

4.10 Site Conditions

4.10.1 The DBE represents that it has taken the necessary steps to ascertain the nature, location and extent of the Work, and that it has investigated and satisfied itself as to the general and local conditions which are applicable to the Work, such as:

4.10.1.1 conditions bearing on transportation, disposal, handling and storage of materials;

4.10.1.2 the availability of labor, water, power and roads;

4.10.1.3 normal weather conditions;

4.10.1.4 physical conditions at the Site;

4.10.1.5 the conditions of the ground; and

4.10.1.6 the character of equipment and facilities needed prior to and during the performance of the Work.

4.10.2 To the extent the DBE encounters subsurface conditions or hazardous materials which differ materially from that actually known by the DBE, or from those ordinarily known to exist or could have been reasonably discovered, or generally recognized as inherent in the area, then notice by the DBE shall be immediately given to the District, before conditions are disturbed, and in no event later than two (2) business days after the first observance of the conditions. If such conditions could not have been reasonably identified by DBE's site investigations and available existing data, and the DBE incurs significant additional costs or delays as a result of such concealed conditions, such conditions may be the subject of a Change Proposal.

Should any existing utilities or services be disturbed, disconnected or damaged during construction, the DBE shall be responsible, at no additional cost or time to the District, for all expenses and consequential damages of whatever nature arising from such disturbance or the replacement or repair thereof and shall repair such items as required to maintain continuing service, including emergency repairs.

4.10.3 The DBE is responsible for foreseeable site conditions and hazardous materials to the extent described in the Contract Documents and/or could be reasonably inferred by DBE based on its experience and expertise on similar Projects in similar areas.

4.11 Hazardous Materials

4.11.1 The DBE agrees that it is solely responsible for investigating and performing remedial actions on all hazardous materials and other related environmental requirements located on the Project as can be reasonably implied from previous testing and inspections of the site included or referred to in the Contract Documents.

4.11.2 Any hazardous materials that are encountered beyond those described in the Contract Documents, or which reasonably could not have been discovered by the DBE before executing this Agreement, may properly be the subject of a Change Proposal. The District agrees that the DBE cannot be considered a hazardous materials generator of any such materials in existence on the Site at the time it is given possession of the Site.

4.11.3 "Hazardous materials" means any substance, the presence of which requires investigation or remediation under any federal, state or local law, statute, regulation, ordinance, order, action, policy or common law; which is

or becomes defined as a "hazardous waste," "hazardous substance," pollutant or contaminant under any federal, state or local law, statute, regulation, rule or ordinance or amendments thereto, including, without limitations, the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. Section 9601 et seq. ("CERCLA"), as amended, or the Resource, Conservation and Recovery Act, as amended, 42 U.S.C. Section 6901 et seq. ("RCRA"); which is petroleum, including crude oil or any fraction thereof not otherwise designated as a "hazardous substance" under CERCLA, including without limitation gasoline, diesel fuel or order petroleum hydrocarbons; which are toxic, explosive, corrosive, flammable, infectious, radioactive, carcinogenic, mutagenic, or otherwise hazardous and is or becomes regulated by any regulatory agency or instrumentality or the District; the presence of which on the Site causes or threatens to cause a nuisance upon the Site or to the adjacent properties or poses or threatens to pose a hazard to the health or safety of persons on or about the Site; the presence of which on adjacent properties could constitute a trespass by the DBE or the District; or as defined in the California Health and Safety Code.

4.11.4 "Environmental Requirements" means all applicable laws, statutes, regulations, rules, ordinances, codes, licenses, permits, orders and similar items of all governmental agencies or other instrumentality's of the State of California and United States and all applicable judicial, administrative and regulatory decrees, judgments and orders relating to the protection of human health or the environment, including, without limitation: all requirements, including but not limited to, those pertaining to reporting, licensing, permitting, investigation and remediation of emissions, discharges, releases or threatened releases of hazardous materials into the air, surface water, ground water or land, or relating to the manufacture, processing, distribution, use, treatment, storage, disposal, transport or handling of hazardous materials; and all requirements pertaining to the protection of the health and safety of employees or the public.

4.12 Shop Drawings, Product Data, Samples, Materials, and Equipment.

4.12.1 Shop drawings means drawings, submitted to DBE by, Subcontractors, manufacturers, supplier or distributors showing in detail the proposed fabrication and assembly of building elements and the installation (i.e., form, fit, and attachment details) of materials or equipment.

4.12.2 DBE shall coordinate all submittals and review them for accuracy, completeness, and compliance with the requirements of the Contract Documents and the DBE's Construction Documents, and shall indicate its approval thereon as evidence of such coordination and review.

4.12.3 Materials and equipment incorporated in the Work shall match the approved samples within tolerances appropriate to the items, and as may be described in the Contract Documents.

4.12.4 Prior to placement of material orders or start of component fabrication, the DBE shall submit to the District all shop drawings approved by the Architect of Record and samples of submittals that relate to finish materials and products. The DBE is to issue a submittal schedule to the District for

comment and the District shall designate the submittals that the DBE is to submit to the District to review for contract compliance.

4.12.5 Wherever the name or brand of manufacturer or an article is listed in the Contract Documents, it is to be used in the Work as the standard. Any variation in quality must be approved by the District.

4.13 Field Engineering

4.13.1 The DBE shall retain and pay expenses of a qualified civil engineer or land surveyor to establish on the Site the required reference points and bench marks, establish building lines and elevations, check for building framing, plumbness, and establish on building frame the required basic grid lines. The engineer or land surveyor shall be licensed in the State of California. DBE shall be responsible for having ascertained pertinent local conditions such as location, accessibility, and general character of the Site and for having satisfied itself as to the conditions under which the Work is to be performed.

4.13.2 The DBE shall locate and protect control points prior to starting Work on the Project site and preserve permanent reference points during construction, and shall require the engineer or surveyor to replace control points which become lost or destroyed.

4.13.3 DBE shall follow best practices, including but not limited to pot holing to avoid utilities. District shall not be liable for any claim for allowances because of DBE's error, failure to follow best practices, or negligence in acquainting itself with the conditions at the Site.

4.13.4 DBE shall protect and preserve established benchmarks and monuments and shall make no changes in locations without the prior written approval of District. DBE shall replace any benchmarks or monuments that are lost or destroyed subsequent to proper notification of District and with District's approval.

4.14 Geotechnical Data and Existing Site Conditions

4.14.1 The District has provided the DBE with preliminary geotechnical data and site conditions, and Title Reports. These documents are provided "for information only". DBE shall be responsible to verify the accuracy of the information provided and, at its cost, obtain any additional measurements, verifications, or supplemental geotechnical report or land survey required to perform their work.

4.14.2 DBE shall verify the location and depth (elevation) of all existing utilities and services before performing any excavation work and provide a drawing that documents these verified conditions as part of their Construction Documents.

4.14.3 The DBE shall obtain, and pay for, the services of geotechnical engineers licensed in the State of California and other consultants to provide services deemed necessary by the DBE. Such services may include reports, test borings, test pits, soil bearing values, percolation tests, air and water pollution tests, ground corrosion and resistivity tests, and other necessary

operations for determining subsoil, air and water conditions, with reports and appropriate professional interpretations and recommendations thereof.

4.14.4 By executing this Agreement, DBE agrees that District has responded to and resolved any conflict, error or ambiguity in the Existing Conditions data and Contract Documents that DBE has brought to District's attention. During performance of the Agreement, DBE will be charged with knowledge of all information that it should have learned in performing its required preconstruction services and preconstruction investigations and other obligations, and shall not be entitled to Change Orders (time or compensation) due to any information, error, inconsistency, omission, or conditions that DBE should have known as a part of this Work. DBE shall be responsible for the resultant losses, including, without limitation, the cost of correcting defective work.

4.15 Meetings and Reports

4.15.1 Prior to commencement of the Work, the DBE shall attend a Project Kick-off meeting, at a time and a place selected by the District's Representative, to discuss procedures to be followed during the course of the work. DBE shall follow the procedures as set forth by the District's Representative and as provided in the DBE's procedure manual to be supplied at the Kick-off conference. The purpose of the meeting will be to introduce the District's key personnel and to review the contract provisions and any other items pertaining to the Project.

4.15.2 Once a week, or at such interval as mutually agreed to by the parties, the District's Representative will meet with the DBE to review the overall Project progress, the status of the design and/or construction, and to discuss any problems that may arise. DBE and its Architect of Record shall attend all progress meetings. Subconsultants, Subcontractors and vendor representatives shall attend the progress meetings as appropriate to the particular stage of the work.

4.15.3 Each month the DBE shall attend a payment meeting with the District's Representative to agree on the percentage of the work completed during the current month to establish an amount to be requested in the Application for Payment.

4.15.4 The DBE shall prepare and submit to the District, during design completion, the Construction Document phase, and the Construction Phase, monthly reports on the Work accomplished during the prior monthly period. Such reports shall be prepared in a manner and in a format approved by the District.

4.15.5 Thirty (30) days prior to the estimated Substantial Completion, the DBE shall hold a meeting to review maintenance manuals, guarantees, warranties, close-out submittals, bonds, and service contracts for materials and equipment. DBE shall also implement repair and replacement of defective items, and extend service and maintenance contracts as desired by the District.

4.16 Notices of Labor Disputes

4.16.1 If DBE has knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of the Work, DBE shall immediately give notice including all relevant information to the District. DBE shall refer to the Project Labor Agreement for additional requirements.

4.16.2 DBE agrees to insert the substance of this Article including this Clause in any subcontract to which a labor dispute may delay the timely performance of the Work, except that each subcontract shall provide that in the event its timely performance is delayed or threatened by delay, by any actual, or potential labor dispute, the Subcontractor shall immediately notify the next higher tier Subcontractor or DBE, as the case may be, of all relevant information concerning the dispute.

4.17 Guarantee

4.17.1 The DBE unconditionally guarantees the building systems and equipment, including but not limited to the fire and life safety systems and equipment, were installed and will work in accordance with the requirements of the Contract Documents, and will remain free of defects in workmanship and materials for a period of two (2) years from the date of Completion. For such equipment or building components started in operation prior to Completion, the DBE's guarantee shall, be in force for two (2) full years after Completion is declared by the District notwithstanding the components operation began prior to the District's declaration of Completion. The completion of LEED Certification and/or other incidental administrative completion items identified by the District shall be completed no later than six (6) months following the date for Completion.

4.17.2 The DBE shall repair or replace any and all guaranteed building systems and equipment, including but not limited to the specialty equipment, fire and life safety systems and equipment, together with any adjacent work that may have been damaged or displaced by the guaranteed systems or equipment, that may be defective in its workmanship or material or becomes inoperable within the guarantee period specified in the Contract Documents, without any expense whatsoever to the District; ordinary wear and tear excepted.

4.17.3 The DBE further agrees, within seven (7) days after being notified in writing by the District, of any work not in accordance with the requirements of the Contract Documents or any defects in the Work, that the DBE shall commence and execute, with due diligence, all work necessary to fulfill the terms of the guarantee. If the District finds that the DBE fails to perform any of the work under the guarantee, the District will proceed to have the work completed at the DBE's expense and the DBE will pay costs of the work upon demand. The District will be entitled to all costs, including reasonable attorney's fees necessarily incurred upon the DBE's refusal to pay the above costs.

4.17.4 Notwithstanding the foregoing subparagraph, in the event of an emergency constituting an immediate danger to health or safety of District employees, property, or invitees, the District may undertake, at the DBE's expense and without prior notice, all work necessary to correct such

hazardous condition(s) when it is caused by work of the DBE not being in accordance with the requirements of the Contract Documents.

4.18 Warranty

The DBE warrants, for a period of two (2) years from the date of Completion, to the District that any and all materials, equipment and furnishings incorporated in the Work will be of good quality and new unless otherwise required or permitted by the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The foregoing warranty excludes improper operation, or normal wear and tear under normal usage under the control of the District.

4.19 Patents, Trademarks, and Copyrights

The DBE shall pay, as part of the GMP, all applicable royalties and license fees on any and all matters arising in connection with the Work. The DBE shall defend the District for all suits or claims for infringement of patent, trademark, and copyrights against the District, and shall indemnify, defend, and hold harmless the indemnified parties from any claims, causes of action, losses, or costs related to any and all matters arising in connection with Work on the Project (such costs to be paid as part of the GMP), except with respect to any particular design process or the product of a particular manufacturer or manufacturers specified or required by the District, other than pursuant to the recommendation or suggestion of the DBE; provided, however, if the DBE has reason to believe that the design, process, or product so specified is an infringement of a patent, the DBE shall be responsible for any loss resulting unless the DBE has provided the District with prompt written notice of the DBE's belief, and the District has nevertheless elected to go forward with such design, process, or product so specified.

4.20 Taxes

The DBE shall pay all applicable taxes for the Work, or portions thereof provided by the DBE, whether or not yet effective or merely scheduled to go into effect. Any federal, state, or local taxes payable on any materials, labor or any other thing to be furnished by DBE under the Contract Documents shall be included in the GMP and paid by DBE.

4.21 Tests and Inspections

4.21.1 The DBE shall be responsible for requesting and scheduling all tests and inspections necessary to ensure the quality of the Work are in accordance with the terms of the Contract Documents. The DBE shall at all times permit the District and its agents, inspectors, officers, and employees access to the Project Site and inspect the Work and such other locations where the Work is in preparation. This obligation shall include maintaining proper facilities and safe access for such inspection. When the Contract Documents require a portion of the work to be tested, such portion of work shall not be covered up until inspected and approved. The DBE shall be solely responsible for notifying the District and the Inspector of Record where and when the work is ready for inspection and testing at least forty-eight (48) hours in advance of the

commencement and completion of construction of each and every aspect of the Work. The District shall provide inspectors to review and verify compliance of the DBE's quality control and assurance teams with the contract documents.

4.21.2 Should any work be covered without the required testing or witnessed by the District, such work shall be uncovered at the DBE's expense. Whenever the DBE intends to perform work on Saturday, Sunday, or a legal holiday, the DBE shall give written notice to the District of such intention at least forty-eight (48) hours prior to performing the work, so that the District may make necessary arrangements.

4.21.3 If the District determines that portions of the Work require additional testing or inspection that is not included in the Contract Documents, the District will instruct the DBE, in writing, to make arrangements for additional testing or inspection by an entity acceptable to the District, and the DBE shall give forty-eight (48) hours written notice to the District of where and when tests and inspections will be conducted so that the District may observe the procedures.

4.21.4 If procedures for testing, inspection or approval reveal failure of a portion(s) of the work to comply with the Contract Documents, the DBE shall bear all costs and time made necessary by such failure(s) including those of repeated procedures and compensation for the District's services and expenses. The DBE shall notify the District in writing within 24 hours of any test conducted by the independent testing agency that reveals work failing to comply with the Construction Documents. Inspection of Work shall not relieve DBE from an obligation to fulfill this Agreement. Project Inspector(s) and the DSA are authorized to suspend work whenever the DBE and/or its Subcontractor(s) are not complying with the Construction Documents. Any work suspension by the Project Inspector(s) and/or DSA shall be without liability to the District.

4.21.5 Required certificates of testing and inspection shall, unless otherwise required by the Contract Documents, be secured by the DBE and delivered to the District within seven (7) days after each test.

4.21.6 Provide qualified on-site personnel to review and record daily construction activities, including subcontract activities, to determine adequacy of work and compliance with the approved plans and specifications. Provide written daily reports including, but not limited to: Project title, date of work, contract day, weather and conditions (temperature, wind, humidity, etc.), a description of the work in progress by corresponding schedule activity number(s), name of each Subcontractor on site and work being performed, location of each trade on the Project site, total daily workforce per trade (including the DBE's work force), material deliveries and quantities, equipment deliveries, potential delays and delays encountered, orders of instruction, unsatisfactory work, tests performed, safety concerns, visitors, and any other issues to document work performed and areas of concern.

4.21.7 Daily reports shall be signed by the DBEs' Quality Assurance Manager and Project Manager and submitted to the Construction Manager no later than 12:00 p.m. following the day work was performed. The DBE shall separately

provide written reports to the Construction Manager of any noted deficiencies in the installed work and corrective measures taken, and test reports of work being installed.

4.22 Air Pollution

The DBE and each Subcontractor shall comply with all State, District and/or local air pollution control rules, regulations, ordinances, and statutes that apply to any work performed under the Agreement. If there is a conflict between the State, District and local air pollution control rules, regulations, ordinances and statutes, the most stringent shall govern.

4.23 Unfair Business Practices

The DBE agrees, and will require all of the DBE's contractors and Subcontractors and suppliers to agree, to assign to the awarding body all rights, title, and interest in and to all causes of action they may have under Section 4 of the Clayton Act (15 U.S.C. Section 15), or under the Cartwright Act (commencing with Section 16700 of the Business and Professions Code), arising from the purchase of goods, services or materials, pursuant to the Contract Documents or any subcontract there under. An assignment made by the DBE, and all additional assignments made by Subcontractors and suppliers, shall be deemed to have been made and will become effective at the time the District tenders Final Payment to the DBE, without further acknowledgment of the parties.

5. DISTRICT'S DUTIES AND RESPONSIBILITIES

5.1 District's Representative

Functions for which this Agreement provides to be performed by the District may be delegated by the District only by written notice to the DBE from the District.

5.2 Communication with the DBE

During the term of this Agreement, the District shall communicate with the DBE, Subcontractors, suppliers, and others performing any part of the Work only through the DBE's authorized representatives, as may be amended, subject to any approvals required by the District as described in the Contract Documents.

5.3 District's Consent

The District shall furnish decisions, information, and/or reviews required by this Agreement in a timely manner so as not to delay the Work, provided that the District shall have no less time for review than set forth in the Project Baseline Schedule as developed by the DBE and accepted by the District.

6. SUBCONTRACTING

6.1 Subletting and Subcontracting

6.1.1 The DBE shall adhere to the rules governing subcontracting as set forth in the Subletting and Subcontracting Fair Practices Act, commencing with Public Contract Code Section 4100. Subcontractor substitutions shall be in accordance with the Subletting and Subcontracting Fair Practices Act. Any violation may subject the DBE to penalties and disciplinary action as provided by the Subletting and Subcontracting Fair Practices Act, including termination of this Agreement.

6.1.2 The DBE shall be responsible for all Work performed under this Agreement. All persons engaged in the Project will be considered employees of the DBE. The DBE shall give personal attention to fulfillment of the Agreement and shall keep the Work under the DBE's control. If DBE subcontracts any part of the Work called for by the Contract Documents, DBE shall be as fully responsible to District for acts and omissions of any Subcontractor and of persons either directly or indirectly employed by any Subcontractor, including Subcontractor caused Project delays, as it is for acts and omissions of persons directly employed by DBE. When any Subcontractor fails to execute a portion of the work in a manner satisfactory to the District, the DBE shall remove such Subcontractor pursuant to the requirements of law immediately upon written notice from the District.

6.1.3 DBE shall be responsible for the coordination of the trades, Subcontractors, sub-subcontractors, and material or equipment suppliers working on the Project.

6.1.4 The District may not permit a Subcontractor who is ineligible to bid or work on, or be awarded, a public works Project pursuant to Sections 1777.1 or 1777.7 of the Labor Code.

6.1.5 All Subcontractors of any tier performing any part of the Work shall be registered as a Public Works Contractor with the Department of Industrial Relations. The DBE shall be responsible for removing, by requesting substitution or otherwise, any Subcontractors who are not in compliance.

6.1.6 District's consent to, or approval of, or failure to object to, any Subcontractor under the Contract Documents shall not in any way relieve DBE of any obligations under the Contract Documents and no such consent shall be deemed to waive any provisions of the Contract Documents.

6.2 Subcontracting Relations

6.2.1 The DBE shall, by Subcontractor agreement, require each Subcontractor, to the extent of the work to be performed by the Subcontractor, to be bound to the DBE by terms of the Contract Documents, and to assume toward the DBE all the obligations and responsibilities which the DBE, by the Contract Documents, assumes toward the District. Each subcontract shall preserve and protect the rights of the District under the Contract Documents with respect to the work to be performed by the Subcontractor.

6.2.2 The DBE shall require each Subcontractor to enter into similar agreements with sub-subcontractors. The DBE shall make available to each proposed Subcontractor, prior to the execution of the Subcontractor

agreement, copies of those portions of the Contract Documents to which the Subcontractor will be bound. Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed second and third tier Subcontractors.

6.2.3 No contractual relationship exists between the District and any Subcontractor, supplier, or sub-subcontractor by reason of the Contract Documents.

6.2.4 DBE is solely responsible for settling any differences between the DBE and its Subcontractor(s) or between Subcontractors.

6.3 Subcontractor Progress Payments

Within seven (7) days of receipt of each progress payment, the DBE shall make payment to Subcontractors in accordance with Business and Professions Code Section 7108.5. 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.

6.4 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.

6.5 Joint Checks

District shall have the right in its sole discretion, if necessary, for the protection of the District, to issue joint checks made payable to the DBE and Subcontractors and/or 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, or a material or equipment supplier, or any obligation from the District to such Subcontractor or a material or equipment supplier or rights in such Subcontractor against the District.

6.6 Contract Assignments

Performance of the Contract Documents may not be assigned except upon written consent of the District. Assignment without District's prior written consent shall be null and void. Consent will not be given to an assignment that would relieve the DBE or the DBE's surety of their responsibilities under the Contract Documents. Any assignment of money due or to become due under the Contract Documents shall be subject to a prior lien for services rendered or material supplied for performance of Work called for under the Contract Documents in favor of all persons, firms, or corporations rendering services or supplying material to the extent that claims are filed pursuant to the Civil Code, Code of Civil Procedure, Government Code, Labor Code, and/or Public Contract Code, and shall also be subject to deductions for liquidated damages or withholding of payments as determined by District in accordance with the Contract Documents. DBE shall not assign or transfer in

any manner to a Subcontractor or supplier the right to prosecute or maintain an action against the District.

7. STATE LABOR, WAGE AND HOUR, APPRENTICE, AND RELATED PROVISIONS

7.1 Labor Compliance and Enforcement

Since this Project is subject to labor compliance and enforcement by the Department of Industrial Relations ("DIR"), DBE specifically acknowledges and understands that it shall perform the Work of this Agreement while complying with all the applicable provisions of Division 2, Part 7, Chapter 1, of the Labor Code and Title 8 of the California Code of Regulations, including, without limitation, the requirement that the DBE and all Subcontractors shall timely furnish complete and accurate electronic certified payroll records directly to the DIR. The District may not issue payment if this requirement is not met.

7.2 Wage Rates, Travel, and Subsistence

7.2.1 Pursuant to the provisions of Article 2 (commencing at section 1770), Chapter 1, Part 7, Division 2, of the Labor Code of California, 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 work is to be performed for each craft, classification, or type of worker needed to execute the Contract Documents are on file at the District's principal office and copies will be made available to any interested party on request. DBE shall obtain and post a copy of these wage rates at the job site.

7.2.2 Holiday and overtime work, when permitted by law, shall be paid for at a rate of at least one and one-half times the above specified rate of per diem wages, unless otherwise specified. The holidays upon which those rates shall be paid need not be specified by the District, but shall be all holidays recognized in the applicable collective bargaining agreement. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code.

7.2.3 DBE shall pay and shall cause to be paid each worker engaged in Work on the Project not less than the general prevailing rate of per diem wages determined by the Director of the Department of Industrial Relations ("DIR") ("Director"), regardless of any contractual relationship which may be alleged to exist between DBE or any Subcontractor and such workers.

7.2.4 If, prior to execution of the Agreement, the Director determines that there has been a change in any prevailing rate of per diem wages in the locality in which the Work under the Contract Documents is to be performed, such change shall not alter the wage rates in the Contract Documents subsequently awarded.

7.2.5 Pursuant to Labor Code section 1775, DBE shall, as a penalty, forfeit the statutory amount (believed by the District to be currently two hundred dollars ($200) to District for each calendar day, or portion thereof, for each worker paid less than the prevailing rates, determined by the District and/or the Director, for the work or craft in which that worker is employed for any

public work done under Contract by DBE or by any Subcontractor under it. The difference between such prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate, shall be paid to each worker by DBE.

7.2.6 Any worker employed to perform Work on the Project, which Work is not covered by any classification listed in the general prevailing wage rate of per diem wages determined by the Director, shall be paid not less than the minimum rate of wages specified therein for the classification which most nearly corresponds to Work to be performed by him, and that minimum wage rate shall be retroactive to time of initial employment of the person in that classification.

7.2.7 Pursuant to Labor Code section 1773.1, per diem wages are deemed to include employer payments for health and welfare, pension, vacation, travel time, subsistence pay, and apprenticeship or other training programs authorized by Labor Code section 3093, and similar purposes.

7.2.8 DBE shall post at appropriate conspicuous points on the Project Site a schedule showing all determined minimum wage rates and all authorized deductions, if any, from unpaid wages actually earned. In addition, DBE shall post a sign-in log for all workers and visitors to the Site, a list of all Subcontractors of any tier on the Site, and the required Equal Employment Opportunity poster(s).

7.3 Hours of Work

7.3.1 As provided in Article 3 (commencing at section 1810), Chapter 1, Part 7, Division 2, of the Labor Code, eight (8) hours of labor shall constitute a legal day of work. The time of service of any worker employed at any time by DBE or by any Subcontractor on any subcontract under the Contract Documents upon the Work or upon any part of the Work contemplated by the Contract Documents shall be limited and restricted by DBE to eight (8) hours per day, and forty (40) hours during any one week, except as hereinafter provided. Notwithstanding the provisions hereinabove set forth, Work performed by employees of DBE in excess of eight (8) hours per day and forty (40) hours during any one week, shall be permitted upon this public work upon compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half times the basic rate of pay.

7.3.2 DBE shall keep and shall cause each Subcontractor to keep an accurate record showing the name of and actual hours worked each calendar day and each calendar week by each worker employed by DBE in connection with the Work or any part of the Work contemplated by the Contract Documents. The record shall be kept open at all reasonable hours to the inspection of District and to the Division of Labor Standards Enforcement of the DIR.

7.3.3 Pursuant to Labor Code section 1813, DBE shall, as a penalty, forfeit the statutory amount (believed by the District to be currently twenty-five dollars ($25)) to the District for each worker employed in the execution of the Contract Documents by DBE or by any Subcontractor for each calendar day

during which a worker is required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of the provisions of Article 3 (commencing at section 1810), Chapter 1, Part 7, Division 2, of the Labor Code.

7.3.4 Any Work necessary to be performed after regular working hours, or on Sundays or other holidays shall be performed without additional expense to the District.

7.4 Payroll Records

7.4.1 DBE shall upload, and shall cause each Subcontractor performing any portion of the Work under this Agreement to upload, an accurate and complete certified payroll record ("CPR") electronically using DIR's eCPR System by uploading the CPRs by electronic XML file or entering each record manually using the DIR's iform (or current form) online on a weekly basis and within ten (10) days of any request by the District or Labor Commissioner at http://www.dir.ca.gov/Public-Works/Certified/Payroll-Reporting.html or current application and URL, showing the name, address, social security number, work classification, 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 the DBE and/or each Subcontractor in connection with the Work.

7.4.2 The CPRs enumerated hereunder shall be filed directly with the DIR on a weekly basis or to the requesting party, whether the District or DIR, within ten (10) days after receipt of each written request. The CPRs from the DBE and each Subcontractor for each week shall be provided on or before Wednesday of the week following the week covered by the CPRs. District may not make any payment to DBE until:

7.4.2.1 The DBE and/or its Subcontractor(s) provide CPRs acceptable to the District and DIR.

7.4.2.2 Any delay in DBE and/or its Subcontractor(s) providing CPRs to the District or DIR in a timely manner may directly delay the District's review and/or audit of the CPRs and DBE's payment.

7.4.3 All CPRs shall be available for inspection at all reasonable hours at the principal office of DBE on the following basis:

7.4.3.1 A certified copy of an employee's CPR shall be made available for inspection or furnished to the employee or his/her authorized representative on request.

7.4.3.2 CPRs shall be made available for inspection or furnished upon request or as required by regulation to a representative of the District, Division of Labor Standards Enforcement, Division of Apprenticeship Standards, and/or the DIR.

7.4.3.3 CPRs shall be made available upon request by the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through the District, Division of

Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested CPRs have not been provided pursuant to the provisions herein, the requesting party shall, prior to being provided the records, reimburse the costs of preparation by DBE, Subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of DBE.

7.4.4 Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by District, Division of Apprenticeship Standards, Division of Labor Standards Enforcement, or DIR shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address, and social security number. The name and address of DBE awarded the Project under the Contract Documents or performing under the Contract Documents shall not be marked or obliterated.

7.4.5 DBE shall inform District of the location of the records enumerated hereunder, including the street address, city, and county, and shall, within five (5) working days of a change in location of the records, provide a notice of change of location and address.

7.4.6 In the event of noncompliance with the requirements of this section, DBE shall have ten (10) days in which to comply subsequent to receipt of written notice specifying in what respects DBE must comply with this section. Should noncompliance still be evident after the ten (10) day period, DBE shall, as a penalty, forfeit up to one hundred dollars ($100) to District for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Labor Commissioner, these penalties shall be withheld from Tenant Improvement Payments then due.

7.5 Apprentices

7.5.1 DBE acknowledges and agrees that, if the Contract Documents involve a dollar amount greater than or a number of working days greater than that specified in Labor Code section 1777.5, then this Agreement is governed by the provisions of Labor Code Section 1777.5 and 29 CFR part 5. It shall be the responsibility of DBE to ensure compliance with this Article and with Labor Code section 1777.5 for all apprenticeship occupations.

7.5.2 Apprentices of any crafts or trades may be employed and, when required by Labor Code section 1777.5, shall be employed provided they are properly registered in full compliance with the provisions of the Labor Code.

7.5.3 Every apprentice shall be paid the standard wage paid to apprentices under the regulations of the craft or trade at which he/she/they is employed, and shall be employed only at the work of the craft or trade to which she/he is registered.

7.5.4 Only apprentices, as defined in section 3077 of the Labor Code, who are in training under apprenticeship standards and written apprentice agreements under Chapter 4 (commencing at section 3070), Division 3, of the Labor Code, are eligible to be employed. The employment and training of each apprentice shall be in accordance with the provisions of the

apprenticeship standards and apprentice agreements under which he/she/they is training.

7.5.5 Pursuant to Labor Code section 1777.5, if that section applies to this Agreement as indicated above, DBE and any Subcontractors employing workers in any apprenticeable craft or trade in performing any Work under this Agreement shall apply to the applicable joint apprenticeship committee for a certificate approving the DBE or Subcontractor under the applicable apprenticeship standards and fixing the ratio of apprentices to journeymen employed in performing the Work.

7.5.6 Pursuant to Labor Code section 1777.5, if that section applies to this Agreement as indicated above, DBE and any Subcontractor may be required to make contributions to the apprenticeship program.

7.5.7 If DBE or Subcontractor willfully fails to comply with Labor Code section 1777.5, then, upon a determination of noncompliance by the Administrator of Apprenticeship, it shall:

7.5.7.1 Be denied the right to bid on any subsequent project for one (1) year from the date of such determination.

7.5.7.2 Forfeit, as a penalty, to District the full amount stated in Labor Code section 1777.7. Interpretation and enforcement of these provisions shall be in accordance with the rules and procedures of the California Apprenticeship Council and under the authority of the Chief of the Division of Apprenticeship Standards.

7.5.7.3 DBE and all Subcontractors shall comply with Labor Code section 1777.6, which section forbids certain discriminatory practices in the employment of apprentices.

7.5.7.4 DBE shall become fully acquainted with the law regarding apprentices prior to commencement of the Work. Special attention is directed to sections 1777.5, 1777.6, and 1777.7 of the Labor Code, and Title 8, California Code of Regulations, Section 200 et seq. Questions may be directed to the State Division of Apprenticeship Standards, 455 Golden Gate Avenue, 9th Floor, San Francisco, California 94102.

7.6 Non-Discrimination

7.6.1 DBE herein agrees not to discriminate in its recruiting, hiring, promotion, demotion, or termination practices on the basis of race, religious creed, national origin, ancestry, sex, sexual orientation, age, or physical handicap in the performance of this Agreement and to comply with the provisions of the California Fair Employment and Housing Act as set forth in Part 2.8 of Division 3 of Title 2 of the California Government Code, commencing at section 12900; the Federal Civil Rights Act of 1964, as set forth in Public Law 88-352, and all amendments thereto; Executive Order 11246; and all administrative rules and regulations found to be applicable to DBE and Subcontractor.

7.6.2 Special requirements for Federally Assisted Construction Contracts: During the performance of the requirement of the Contract Documents, DBE agrees to incorporate in all subcontracts the provisions set forth in Chapter 60-1.4(b) of Title 41 published in Volume 33 No. 104 of the Federal Register dated May 28, 1968.

7.7 Labor First Aid

DBE shall maintain emergency first aid treatment for DBE's laborers and mechanics on the Project which complies with the Federal Occupational Safety and Health Act of 1970 (29 U.S.C. § 651 et seq.) and the California Occupational Safety and Health Act of 1973 (Lab. Code, § 6300 et seq.; 8 Cal. Code of Regs., § 330 et seq.).

8. PAYMENTS AND COMPLETION

8.1 Guaranteed Maximum Price

In consideration of DBE's obligations under the Contract Documents, DBE will be compensated in an amount to be determined under the Initial GMP and Final GMP procedures and in accordance with the payment procedures set forth herein. Except as otherwise provided in the Contract Documents, the GMP will fully compensate DBE for all of the services required under the Contract Documents, including the scope of services described in this Contract, and DBE will not seek additional compensation from District in excess of that amount.

8.1.1 Any unused portion of the GMP shall be considered as cost savings and retained by the District.

8.1.2 Initial GMP

8.1.2.1 At the end of the Schematic Design Milestone, DBE shall prepare and submit to District for negotiation a proposed Initial GMP, with all backup and subject to the open book policy set forth in Section 8.4.

8.1.2.2 Included in the proposed Initial GMP, DBE shall propose not-to-exceed values for at least each of the following subtrades ("Selected Subtrades"):

8.1.2.2.1 Concrete.

8.1.2.2.2 Electrical.

8.1.2.2.3 HVAC.

8.1.2.2.4 Sitework.

8.1.2.3 If the Parties agree upon an Initial GMP, the Parties shall execute a Contract amendment for the Initial GMP. The Initial GMP shall control until it is superseded by the Final GMP.

8.1.3 Final GMP

8.1.3.1 At the end of the 50% Design Development Milestone, DBE shall prepare and submit to District for negotiation a proposed Final GMP, with all backup and subject to the open book policy set forth in Section 8.4.

8.1.3.2 The proposed Final GMP values for each of the Selected Subtrades shall not exceed the corresponding Initial GMP values for the Selected Subtrades.

8.1.3.3 If the Parties agree upon a Final GMP, the Parties shall execute a Contract amendment for the Final GMP. The Final GMP shall supersede and replace the Initial GMP.

8.1.3.4 Other than the Design Fee, which shall be compensated pursuant to Section 8.2, any fees or costs incurred by DBE prior to the Final GMP, including without limitation all construction labor and materials subcontracts, are subject to District's prior written approval, and will only be reimbursable by and/or enforceable against District contingent upon Board approval of the Final GMP.

8.1.4 Termination Before Final GMP

8.1.4.1 In the event that the Parties are unable to agree upon the Initial GMP or Final GMP, the District may, at its option, terminate this Contract before Final GMP upon three (3) days written notice to DBE.

8.1.4.2 Upon termination before Final GMP:

8.1.4.2.1 DBE shall deliver to District all materials and documents developed in the performance of this Contract up to the notice of termination before Final GMP, including, all drawings, designs, specifications, notes, and other work, all of which District shall retain ownership over and unlimited rights in under Section 3.2.2.7, which shall survive termination.

8.1.4.2.2 DBE and District hereby agree that the exact amount of damages for failure to agree upon an Initial GMP or Final GMP, resulting in termination before Final GMP, is extremely difficult or impossible to determine. If the Contract is terminated before Final GMP, it is understood that District will suffer damage. It being impractical and unfeasible to determine the amount of actual damage, it is agreed DBE shall pay to District as fixed and liquidated damages the sum of **three thousand five hundred Dollars ($3,500)** upon termination before Final GMP. It is hereby understood and agreed that this amount is not a penalty.

8.1.4.2.3 Following DBE's delivery of all work product and payment of or credit for liquidated damages under the above Sections, District shall pay DBE only for undisputed actual fees and costs under the Design Fee incurred prior to the termination notice. DBE shall have no other claims against the District.

8.1.4.2.4 District reserves all rights to enter into separate contracts with any DBE member for any subsequent work concerning the Project.

8.1.4.3 The District's termination option under this section is not exclusive and is in addition to all other rights and remedies under the Contract including, without limitation, termination or suspension under Section 12.

8.2 Compensation for Design Phase Services

District agrees to reimburse DBE in the total amount not to exceed **[To be determined with awarded DBE]** ("Design Fee"), for the performance of all Design Phase services contemplated under the Contract Documents. DBE shall be paid monthly for the actual fees and allowed costs and expenses for all time and materials required and expended for work requested and specified by the District as completed. Said amount shall be paid within thirty (30) days upon submittal to and verification by the District of a monthly billing statement showing completion of the tasks for that month on a line-item basis. The Design Fee is included in, and not in addition to, the GMP.

8.3 Compensation for Construction Phase Services

Following District's issuance of the Notice to Proceed with Construction, District shall pay DBE up to the GMP less the Design Fee for all Construction Phase services contemplated under the Contract Documents, in accordance with the payment procedures set forth herein.

8.3.1 Cost of the Work

The term Cost of the Work shall mean the costs necessarily incurred in the proper performance of the Work contemplated by the Contract Documents. Such costs shall be at rates no higher than the standard paid at the place of the Project except with the prior consent of the District. The Cost of the Work shall include only the items set forth in this section and approved by the District.

8.3.1.1 General Conditions

The General Conditions as set forth in GMP shall be included in a progress billing as incurred. Said rates shall include all costs for labor, equipment and materials for the items identified therein which are necessary for the proper management of the Project, and shall include all costs paid or incurred by the DBE for insurance, permits, taxes, and all contributions, assessments and benefits, holidays, vacations, retirement benefits, incentives to the extent contemplated, whether required by law or collective bargaining agreements or otherwise paid or provided by DBE to its employees. The District reserves the right to request changes to the personnel, equipment, or facilities provided as General Conditions as may be necessary or appropriate for the proper management of the Project, in which case, the District shall be entitled to a reduction in the cost of General Conditions based on the rates set.

8.3.1.2 Subcontract Cost

Payments made by the DBE to Subcontractors (inclusive of the Subcontractor's bonding, if required, and insurance costs, which shall be included in the subcontract amount), which payments shall be made in accordance with the requirements of the Contract Documents.

8.3.1.3 DBE Performed Work

Costs incurred by the DBE for self-performed work at the direction of District or with the District's prior approval, as follows:

8.3.1.3.1 Actual costs to the DBE of wages of construction workers, excluding all salaried and/or administrative personnel, directly employed by the DBE to perform the construction of the Work at the site.

8.3.1.3.2 Wages or salaries and customary benefits, such as sick leave, medical and health benefits, holidays, vacations, incentive programs, and pension plans of the DBE's field supervisory, safety and administrative personnel when stationed at the site or stationed at the DBE's principal office, only for that portion of their time required for the Work.

8.3.1.3.3 Wages and salaries and customary benefits, such as sick leave, medical and health benefits, holidays, vacations, incentive programs and pension plans of the DBE's supervisory or administrative personnel engaged at factories, workshops or on the road, in expediting the production or transportation of materials or equipment required for the Work, but only for that portion of their time required for the Work.

8.3.1.3.4 Costs paid or incurred by DBE for taxes, insurance, contributions, assessments required by law or collective bargaining agreements and for personnel not covered by such agreements, and for customary benefits such as sick leave, medical and health benefits, holidays, vacations and pensions, provided such costs are based on wages and salaries included in the Cost of the Work.

8.3.1.3.5 Costs, including transportation and storage, of materials and equipment incorporated in the completed construction, including costs of materials in excess of those actually installed to allow for reasonable waste and spoilage. Unused excess materials, if any, shall become the District's property at the completion of the Work or, at the District's option, shall be sold by the DBE. Any amounts realized from such sales shall be credited to the District as a deduction from the Cost of the Work.

8.3.1.3.6 Costs, including transportation and storage, installation, maintenance, dismantling and removal of materials, supplies, machinery and equipment not customarily

owned by construction workers, that are provided by the DBE at the site and fully consumed in the performance of the Work; and cost (less salvage value) of such items if not fully consumed, whether sold to others or retained by the DBE. Cost for items previously used by the DBE shall mean fair market value.

8.3.1.3.7 Rental charges for temporary facilities, machinery, equipment, vehicles and vehicle expenses, and hand tools not customarily owned by construction workers that are provided by the DBE at the site, whether rented from the DBE or others, and the costs of transportation, installation, minor repairs and replacements, dismantling and removal thereof and costs of DBE's Project field office, overhead and general expenses including office supplies, parking, office equipment, and software. Rates and quantities of equipment rented shall be subject to the District's prior approval.

8.3.1.3.8 Costs of removal of debris from the site, daily clean-up costs and dumpster charges not otherwise included in the cost of the subcontracts which exceeds the clean-up provided under the General Conditions.

8.3.1.3.9 Costs of that portion of the reasonable travel, parking and subsistence expenses of the DBE's personnel incurred while traveling and discharging duties connected with the Work.

8.3.1.3.10 Costs of materials and equipment suitably stored off the site at a mutually acceptable location, if approved in advance by the District.

8.3.1.4 Allowances

8.3.1.4.1 Allowances Included in Cost of Work

Because it is impossible at the time of execution of the Contract to determine the exact cost of performing certain tasks, the Cost of the Work shall include the following Allowances as noted here:

Task/Work	**Allowance Amount**
Design/Estimating Allowance	TBD
DBE Construction Allowance	TBD
Total Allowance Amount	

8.3.1.4.1.1 The Design/Estimating Allowance is only for use during the Design Phase to resolve issues that arise when the GMP does not fully address Project

design requirements, District-mandated changes in the design, or clarifications to information available when the GMP was developed that impact the design.

8.3.1.4.1.2 The DBE Construction Allowance is only for use during the Construction Phase to pay costs for unforeseen conditions and any errors and omissions in DBE's design.

8.3.1.4.1.3 The Allowance Amount for an Allowance Item includes the direct cost of labor, materials, equipment, transportation, taxes and insurance associated with the applicable Allowance Item. All other costs, including design fees, DBE's overall project management and general conditions costs, overhead and fee, are deemed to be included in the original GMP, and are not subject to adjustment regardless of the actual amount of the Allowance Item.

8.3.1.4.1.4 The Allowances shall not be used without prior written approval by District. The District shall process expenditures from the Allowances in the form of an Allowance Expenditure Directive ("AED"). The Allowances are included in the GMP. Any unused Allowance or unused portion thereof shall be deducted from the Cost of the Work to the benefit of the District.

8.3.1.4.1.5 Escalation Allowance

8.3.1.4.1.5.1 Separate from and not included in the Cost of the Work or the GMP, the District shall hold an Escalation Allowance in the amount of ten percent (10%).

8.3.1.4.1.5.2 The Escalation Allowance shall not be used without District's prior written approval and shall only be used for Excess Escalation, as described herein, not to exceed the amount of the Escalation Allowance. If some or all of the Escalation Allowance is used, that amount shall be added to the GMP and may then be billed by DBE. All unused amounts of the Escalation Allowance shall be retained by District. DBE shall be responsible for all cost escalation in excess of the amount of the Escalation Allowance.

8.3.1.4.1.5.3 At or around the Midpoint of Construction, the Escalation Allowance shall be available for use to the extent that the Calculated Escalation exceeds the Assumed Escalation, but not to exceed Two Million and 00/100 Dollars ($2,000,000.00).

8.3.1.4.1.5.4 The Midpoint of Construction shall mean the month that is halfway through the duration of construction (or closest thereto) according to DBE's Baseline Schedule.

8.3.1.4.1.5.5 Excess Escalation is the amount in excess of the Assumed Escalation. Assumed Escalation shall apply five percent (5%) annual escalation compounded to the Midpoint of Construction to the amount stated by DBE as the Lump Sum for Construction Costs under its Price Proposal Form.

8.3.1.4.1.5.6 Calculated Escalation shall use the California Department of General Services ("DGS") California Construction Cost Index ("CCCI") to determine the applicable escalation rate. The applicable escalation rate shall be the difference in the monthly published DGS CCCI amount between (A) the Midpoint of Construction and (B) August 2022, converted to an annual percentage based on the number of years between (A) and (B). Calculated Escalation shall apply this annual percentage compounded to the Midpoint of Construction to the amount stated by DBE as the Lump Sum for Construction Costs under its Price Proposal Form less the amount of Assumed Escalation.

8.3.1.4.1.5.7 DBE acknowledges and agrees that the Escalation Allowance is the only compensation that shall be available for cost escalation on this Project and that the calculation provided under this Contract shall be the only permitted means of calculating cost escalation. DBE hereby waives and releases all other claims based upon or involving cost escalation in any form, including, without limitation, all claims for cost escalation in excess of the amount of the Escalation Allowance.

8.3.1.5 Miscellaneous Costs

8.3.1.5.1 Where not included in the General Conditions, and with the prior approval of District, costs of document reproductions (photocopying and blueprinting expenses), long distance telephone call charges, postage, overnight and parcel delivery charges, telephone costs including cellular telephone charges, facsimile or other communication service at the Project site, job photos and progress schedules, and reasonable petty cash expenses of the site office. DBE shall consult with District to determine whether District has any vendor

relationships that could reduce the cost of these items and use such vendors whenever possible.

8.3.1.5.2 Sales, use, gross receipts, local business and similar taxes imposed by a governmental authority that are related to the Work.

8.3.1.5.3 Fees and assessments for permits, plan checks, licenses and inspections for which DBE is required by the Contract Documents to pay including, but not limited to, permanent utility connection charges, street use permit, street use rental, OSHA permit and sidewalk use permit and fees.

8.3.1.5.4 Fees of laboratories for tests required by the Contract Documents.

8.3.1.5.5 Deposits lost for causes other than the DBE's or its subcontractors' negligence or failure to fulfill a specific responsibility to the District as set forth in the Contract Documents.

8.3.1.5.6 Expenses incurred in accordance with the DBE's standard personnel policy for relocation and temporary living allowances of personnel required for the Work if approved in advance by District.

8.3.1.5.7 Where requested by District, costs or expenses incurred by DBE in performing design services for the design-build systems.

8.3.1.5.8 Other costs incurred in the performance of the Work if, and to the extent, approved in advance by District.

8.3.1.5.9 Costs due to emergencies incurred in taking action to prevent threatened damage, injury or loss in case of an emergency affecting the safety of persons and/or property.

8.3.1.5.10 Provided all other eligible costs have been deducted and as part of the calculation of amounts due DBE for Final Payment, costs of repairing and correcting damaged or non-conforming Work executed by the DBE, Subcontractors or suppliers, providing that such damage or non-conforming Work was not caused by negligence or failure to fulfill a specific responsibility of the DBE and only to the extent that the cost of repair or correction is not recovered by the DBE from insurance, sureties, Subcontractors or suppliers.

8.3.1.6 Excluded Costs

The following items are considered general overhead items and shall not be billed to the District:

8.3.1.6.1 Salaries and other compensation of the DBE's personnel stationed at DBE's principal office or offices other than the Project Field Office, except as specifically provided in Section 8.3.1.3.

8.3.1.6.2 Expenses of the DBE's principal office and offices other than the Project Field Office.

8.3.1.6.3 Overhead and general expenses, except as may be expressly included in this Section 8.3.1.

8.3.1.6.4 The DBE's capital expenses, including interest on the DBE's capital employed for the Work.

8.3.1.6.5 Costs that would cause the GMP (as adjusted by Change Order, if any) to be exceeded.

8.4 Open Book Policy

There will be an open book policy with DBE and its construction team. District shall have access to all subcontractor bids, value engineering back-up, allowance breakdown and tracking, and fees.

8.5 Changes to GMP

8.5.1 The Parties acknowledge that the GMP is full compensation for all Work required by the Contract Documents, including the plans and specifications.

8.5.2 As indicated in Section 11, the Parties may add to or remove from the Project specific scopes of work. Based on these change(s), the Parties may agree to a reduction or increase in the GMP. If a cost impact of a change is agreed to by the Parties, it shall be paid upon the payment request from the DBE for the work that is the subject of the change in accordance with Section 11. The amount of any change to the GMP shall be calculated in accordance with Section 11.

8.5.3 The Parties agree to reduce the GMP for the unused portion of the Allowance(s), if any.

8.5.4 Cost Savings

DBE shall work cooperatively with Criteria Architect, Construction Manager, subcontractors, and District, in good faith, to identify appropriate opportunities to reduce the Project costs and promote cost savings. Any identified cost savings from the GMP shall be identified by DBE, and approved in writing by the District. If any cost savings require revisions to the Construction Documents, DBE shall work with the District and Criteria Architect with respect to revising the Construction Documents and, if necessary, obtaining the approval of DSA with respect to those revisions. DBE shall be entitled to an adjustment of Contract Time for delay in completion caused by any cost savings adopted by District pursuant to Section 11, if requested in writing before the approval of the cost savings.

8.6 Schedule of Values

Within ten (10) days after the date of Notice to Proceed with Design and prior to the first Application for Payment, the DBE shall submit to the District a Schedule of Values ("SOV") for the Work included in the original Agreement, supported by such data to substantiate the accuracy as the District may require. This SOV unless objected to by the District within fifteen (15) days of receipt, shall be used as a basis for progress payments.

8.6.1 This SOV may be adjusted from time-to-time as the subcontracting plan is finalized. All changes to the SOV must be submitted to the District for acceptance.

8.7 Payments

DBE shall be paid monthly for the actual fees and allowed costs and expenses for all time and materials required and expended for work requested and specified by the District as completed. Said amount shall be paid within thirty (30) days upon submittal to and verification by the District of a monthly billing statement showing completion of the tasks for that month on a line-item basis.

8.8 Application for Payment.

8.8.1 The DBE shall deliver to the District on the last business day of each month, or as otherwise agreed by both parties, an Application for Payment, in the format approved by the District, covering that portion of the GMP allocated to the Work completed during each month and in accordance with the SOV. Invoices shall include the contract number, the Project number, the amendment number, DBE's Federal Employer Identification Number (FEIN); and shall be submitted to the District in care of the District's Construction Manager.

8.8.2 Application for payment shall not be submitted more frequently than once monthly. The application for payment shall be signed by an officer or designee of the DBE's firm. Provided the Application for Payment is received and approved by the District, the District shall make payment to the DBE not later than thirty (30) days after receipt by the District of a payment application that is strict conformance with the requirements herein. With each Application for Payment, the DBE shall submit such evidence as may be necessary to demonstrate costs incurred or estimated to be incurred in accordance with the SOV during such month and the percentage of completion of each category of Work.

8.9 Progress Payments

The District shall pay the DBE the progress payments through the period covered by the Application for Payment, as provided herein. Upon receipt of an Application for Payment from the DBE, the District will promptly review the same to determine if it is a proper Application for Payment based on the approved SOV. Any Application for Payment determined by the District not to be in strict conformance with the requirements herein set for payment shall be rejected, and returned to DBE to be modified and processed per the

Agreement. The District's reason(s) for rejecting the Application for Payment shall be stated in writing.

8.10 Withholding of Payment

8.10.1 The District shall withhold payment in whole, or in part, as required by statute. In addition, 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 herein cannot be made. Payment, in whole, or in part, will be withheld based on the need to protect the District from loss because of, but not limited to, any of the following:

8.10.1.1 Defective Work not remedied within FORTY-EIGHT (48) hours of written notice to DBE.

8.10.1.2 Stop Payment Notices or other liens served upon the District as a result of the Agreement.

8.10.1.3 Liquidated damages assessed against the DBE.

8.10.1.4 The cost of completion of the Agreement if there exists reasonable doubt that the Work can be completed for the unpaid balance of the GMP or by the Contract Time.

8.10.1.5 Damage to the District or other contractor(s).

8.10.1.6 Unsatisfactory or untimely prosecution of the Work by the DBE.

8.10.1.7 Failure to store and properly secure materials.

8.10.1.8 Failure of the DBE to submit, on a timely basis, proper, sufficient, and acceptable documentation required by the Contract Documents, including, without limitation, Schedule(s), Schedule of Submittals, SOV, Monthly Progress Schedules, Shop Drawings, Product Data and samples, Proposed product lists, executed Change Orders, and/or verified reports.

8.10.1.9 Failure of the DBE to maintain As-Built Drawings.

8.10.1.10 Unauthorized deviations from the Contract Documents.

8.10.1.11 Failure to provide acceptable electronic certified payroll records, as required by the Labor Code, by these Contract Documents or by written request for each journeyman, apprentice, worker, or other employee employed by the DBE and/or by each Subcontractor in connection with the Work for the period of the Application for Payment or if payroll records are delinquent or inadequate.

8.10.1.12 Failure to properly pay prevailing wages as required in Labor Code section 1720 et seq., failure to comply with any other Labor Code requirements, and/or failure to comply with labor compliance monitoring and enforcement by the DIR.

8.10.1.13 Failure to comply with any, if applicable federal requirements regarding minimum wages, withholding, payrolls and basic records, apprentice and trainee employment requirements, equal employment opportunity requirements, Copeland Act requirements, Davis-Bacon Act and related requirements, Contract Work Hours and Safety Standards Act requirements.

8.10.1.14 Failure to properly maintain or clean up the Site.

8.10.1.15 Failure to timely indemnify, defend, or hold harmless the District.

8.10.1.16 Failure to perform any implementation and/or monitoring required by the General Permit, including without limitation any SWPPP for the Project and/or the imposition of any penalties or fines therefore whether imposed on the District or DBE.

8.10.1.17 Any payments due to the District, including but not limited to payments for failed tests, utilities changes, or permits.

8.10.1.18 Failure to pay any royalty, license or similar fees.

8.10.1.19 Failure to pay Subcontractor(s) or supplier(s) as required by law and DBE's subcontract agreement and by the Contract Documents; and

8.10.1.20 DBE is otherwise in breach, default, or in substantial violation of any provision of the Contract Documents.

8.11 Payment for Stored Materials

Unless otherwise provided in the Contract Documents, payment will be made on account for materials or equipment not incorporated in the Work but delivered and suitably stored at the Site and/or if approved in advance by the District, and at the District's discretion on case-by-case basis, payments may be made for materials or equipment stored at some other bonded or otherwise secure location agreed upon in writing. Payments made for materials or equipment stored on or off-site shall be conditioned upon submission by the DBE of bills of sale or such other procedures satisfactory to the District to establish District's title to such materials or equipment or otherwise protect the District's interest, including applicable insurance and transportation to the Site for those materials and equipment stored off-site.

8.12 Payments as Trust Funds

Any and all funds payable to the DBE are hereby declared to constitute trust funds in the hands of the DBE to be applied first to payment of claims of Subcontractors, sub-subcontractors, architects, engineers, surveyors, laborers, material men or employees arising out of the described Work, to obligations for utilities furnished, tax imposed or such to the payment of premiums on security or other bonds, and to payment of insurance premiums relating to the Project and to payments and contributions to union pension plans and trust funds before application to any other purpose.

8.13 Payment Not a Waiver

8.13.1 No payment hereunder, including Final Payment to DBE, nor District's use or Beneficial Occupancy of the Work, shall release DBE with respect to design, construction, workmanship, materials, equipment or machinery incorporated in the Work which is found to be defective, unsound or improper.

8.13.2 No payment made under the Agreement, shall be evidence of performance thereof, either wholly or in part, nor shall it be construed to be acceptance of defective work or improper material, or an approval of any items in any application for payment.

8.14 Waiver of Stop Payment Notice and Payment Bond Rights

The DBE shall attach to each application for payment, a waiver of all stop payment notice and payment bond rights as provided in Civil Code sections 8132, 8134, 8136 or 8138, with respect to all amounts requisitioned up to and including the then current requisition from the DBE, which waiver of lien and payment bond rights covers all amounts requisitioned from the DBE's Subcontractors and all tiers and suppliers. DBE shall make available copies of similar waivers from its Subcontractors of all tiers and suppliers.

8.15 Retention

8.15.1 The District will retain five percent (5%) of such estimated value of all Work completed (excluding the Design Fee) and a like percentage within limits established by law, of the value of materials so estimated to have been furnished, delivered and unused, as aforesaid, as part of security for fulfillment of the Contract Documents by the DBE. The District will pay monthly to the DBE while executing the Work the balance not retained after deducting all previous payments and all sums to be retained under provisions of the Contract Documents.

8.15.2 No interest shall be paid on any retention, or on any amounts withheld due to a failure of the DBE 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 DBE pursuant to Public Contract Code section 22300.

8.15.3 Investment Alternative.

8.15.3.1 At the request and expense of the DBE, and in accordance with Public Contract Code Section 22300, the District will make payment of the retention earned directly to a state or federally chartered bank in California, as the escrow agent.

8.15.3.2 The escrow agreement shall be substantially similar to the form "Escrow Agreement for Security Deposits in Lieu of Retention" found in Public Contract Code Section 22300.

8.15.3.3 Upon satisfactory completion of the Work, the DBE shall receive from the escrow agent all securities, interest, and payments

received by the escrow agent from the District, pursuant to the terms of the Escrow Agreement.

8.16 Final Payment, Occupancy, and Completion

8.16.1 The District reserves the right to occupy all or any part of the Project prior to completion of the Work, upon written notice.

8.16.2 The District's occupancy does not constitute acceptance by the District of the Work, or any portion of the Work, nor will it relieve the DBE of responsibility for correcting defective Work or materials found at any time before Completion, or during the guarantee period after District's acceptance. However, when the Project includes separate buildings, and one or more of the buildings is entirely occupied by the District, then upon written request by the DBE and by written consent from the District, the guarantee period will commence to run for a building or buildings from the date of the District's Beneficial Occupancy of a building or buildings.

8.16.3 Beneficial Occupancy. The District may occupy or use any completed or partially completed portion of the Work. Such partial occupancy or use may commence whether or not the portion is complete. Immediately prior to such occupancy, the District and the DBE shall jointly inspect the area to be occupied in order to determine and record the condition of the Work. Unless otherwise agreed, partial occupancy or use of a portion of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

8.16.4 When the DBE considers the Work complete, the DBE and the District shall collaboratively prepare a single comprehensive punch list. The DBE shall then proceed promptly to complete and correct the punch list items. Failure to include an item on the punch list does not alter the responsibility of the DBE to complete all work in accordance with the Contract Documents.

8.16.5 Upon completion of the punch list the District will make an inspection to determine whether the work has been completed. The Notice of Completion shall be issued when all work is complete, and the District has formally accepted the Project.

8.16.6 Waiver of Claims. Acceptance of Final Payment by the DBE shall constitute a waiver of affirmative claims by the DBE, except those previously made in writing and identified as unsettled at the time of Final Payment.

8.16.7 Final Payment. Upon execution of the Notice of Completion, providing no stop notices have been filed that have not been discharged or bonded, all amounts unpaid under the Agreement will be paid to DBE. The District may withhold any reasonable sums payable to DBE for the value of any Work, which the District found defective and ordered to be replaced. Final Payment of withholdings will be made when the Work is completed and/or defective Work replaced.

8.16.7.1 The District shall pay the remaining amount up to the GMP due to the DBE, after:

8.16.7.1.1 Acceptance and Close-out of the Work.

8.16.7.1.2 Resolution of all stop payment notices.

8.16.7.1.3 Execution by the DBE of a release of all claims against the District pursuant to this Agreement.

8.16.7.1.4 Any and all other requirements in this Agreement that provide for satisfaction prior to final payment.

8.16.8 The DBE is required to pay Subcontractors from whom retention has been withheld within seven (7) days of receipt from the District of retention proceeds.

9. SCHEDULE

9.1 Contract Time

The "Contract Time" is the period from receipt by DBE of written authorization to begin the Project in the form of a Notice to Proceed with Design from the District, until the scheduled date of Completion of the Work. The DBE agrees to design and manage the Work in accordance with the Project Milestone Schedule and approved Baseline Schedule.

9.2 Completion

By executing this Agreement, the DBE confirms that the Contract Time and Milestone Dates, as stated in the RFQP Schedule Summary, are of the essence of this Agreement. The DBE confirms that the Contract Time and Milestone Dates allow a reasonable period of time for achieving the Completion of the Work for the Project.

9.3 Schedules

9.3.1 The DBE shall be responsible for the development and maintenance of the Preliminary Baseline Schedule, the Baseline Schedule, the Progress Schedule and the Short-Term Schedule as described below. The DBE shall submit a schedule for the execution of the Work for the District's review and response for each phase of the project. The District's review of and response to the schedule submissions shall not be construed as relieving the DBE of its control over the means, methods, sequences and techniques for executing the Work. Each schedule shall provide an interrelated means for defining activities involved in the planning, design, construction, and completion of the Project, their sequences and elapsed completion time from the date of the Notice to Proceed.

9.3.2 Each schedule shall utilize CPM (Critical Path Method) and shall be submitted in diagram and listed form. The computer generated schedules shall permit the DBE to obtain several print sorts that aid in identifying various activities and requirements. The DBE shall utilize Primavera Project Planner for Windows software (P6) by Primavera Systems, Inc. DBE will provide all data files electronically by email or on flash drive.

9.3.3 DBE's Preliminary Baseline Schedule. Within fourteen (14) calendar days from the Notice to Proceed with Design, the DBE shall submit a Preliminary Baseline Schedule to the District. This schedule shall show, but is not limited to, the general plan for the work to be completed in the first ninety (90) calendar days of the Agreement. The Preliminary Baseline Schedule shall contain, but not be limited to:

9.3.3.1 dates established in the District's Project Milestone Schedule;

9.3.3.2 dates to acquire, set up and occupy the field office;

9.3.3.3 dates of all mobilization activities on site, including notices and permits;

9.3.3.4 dates detailing the planned design schedule, including submittals and reviews;

9.3.3.5 anticipated dates for the start and completion of each stage of the design and construction process; and

9.3.3.6 established Milestone Dates representing important events in the first 90 days and major milestones representing the completion of a group of activities in the first year.

9.3.4 The Preliminary Baseline Schedule shall be in the form of a CPM schedule. The District will review the DBE's Preliminary Baseline Schedule for conformance with the Project Milestone Schedule and interrelationships with other activities requiring coordination that may be outside the scope of this Agreement. Upon completion of the review, the District may make recommendations to the DBE as to adjustments to the Preliminary Baseline Schedule. These recommendations, if accepted by both the District and DBE, will be incorporated into the development of the DBE's Baseline Schedule.

9.3.5 DBE Baseline Schedule. Within sixty (60) calendar days after the Notice to Proceed with Design, the DBE, after an initial meeting with the District, shall prepare a proposed Baseline Schedule for the Project. Recognizing that planning activities and design activities need time control to no less degree than construction activities, this schedule shall include, but not be limited to:

9.3.5.1 A CPM format that incorporates all activities with descriptions, sequence, logic relationships, duration estimates, resource-loading, cost loading and other information required for all design, preconstruction and construction activities. Resource loading will be by trade only for each activity. Cost loading will be accomplished through Level of Effort summary activities and not for each schedule activity. The intent of cost loading in this way is to provide a high-level comparison of costs and project progress. Each activity shall have a minimum of one predecessor and one successor, with the exception of the first and last activities. The first activity will be denoted as "Notice to Proceed" and the last activity will be denoted as "Completion". Both these activities shall be shown on the baseline

and monthly updates as Project Milestones as stipulated in the Agreement.

9.3.5.2 The CPM format shall include all Project Milestones defined in this Agreement and/or by the DBE's proposed Baseline Schedule, as well as all engineering, fabrication and delivery dates required to support the Project Milestones.

9.3.5.3 Activities indicating the start and finish dates for Project design, engineering, preparation of design development and Construction Documents, government agency plan check and District agency document review.

9.3.5.4 Activities to be integrated and shown in the CPM network shall include all milestones representing the DBE's submittal dates and activities representing the District's review period of each submittal (which review period shall in no case be scheduled for less than ten (10) working days); DBE's procurement of materials and equipment; submittals; manufacture and/or fabrication, testing and delivery to the job-site of special material and major equipment; equipment installation and preliminary, final and performance testing of equipment or systems. A standalone submittal schedule will be provided in lieu of all submittals being enumerated in the CPM Project Schedule. Only major equipment and long lead item submittals will be included in the Project Schedule.

9.3.5.5 Activities showing the start and finish dates for all temporary works; all construction of mock–ups, and prototypes and/or samples.

9.3.5.6 Activities showing start and finish dates of owner-furnished items and interface requirement dates with other contractors; regulatory agency approvals; and permits required for the performance of the work.

9.3.5.7 Activities showing start and finish of tenant programming (as appropriate), modular furniture, tenant improvement work and phased occupancy.

9.3.5.8 Close-out activities, including activities required for DSA certification.

9.3.5.9 The schedule shall consider all foreseeable factors or risks affecting, or which may affect the performance of the Work, including historical and predicted weather conditions, applicable laws, regulations or collective bargaining agreements pertaining to labor, transportation, traffic, air quality, noise and any other applicable regulatory requirements.

9.3.5.10 The DBE shall not use any "float suppression" techniques such as preferential sequencing or logic, special lead/lag constraints or unjustifiably over-estimating activity durations in preparing the

schedule. ("Finish no later" constraints will be permissible for Project Milestones only.)

9.3.5.11 The DBE shall attach a narrative report which explains assumptions used for activity durations, its assumptions regarding crew sizes, equipment requirements and production rates, any potential areas of concern or specific areas requiring coordination it may have identified and any long-lead time materials or equipment in the work.

9.3.5.12 The DBE shall formally present the detailed time-scaled CPM network for the duration of the Contract Time, demonstrating compliance with Project Milestones and other requirements to the District clearly showing the critical path(s) of the Project through completion.

9.3.5.13 Time units for all schedules shall be in calendar days, and no construction activity scheduled to commence within sixty (60) days of the Data Date shall have a duration greater than seven (7) calendar days. Activities scheduled to start more than sixty (60) days of the Data Date shall have durations no greater than twenty (20) days.

9.3.6 The proposed Baseline Schedule shall be submitted and reviewed by the District. Changes to the Baseline Schedule shall be reviewed with the District prior to implementation. The District, at its sole discretion, may allow or require the DBE to more fully detail portions of the Baseline Schedule at a later date.

9.3.7 The District shall notify the DBE of acceptance or of any necessary changes to the CPM network within ten (10) working days from the formal presentation, after which the DBE shall make the required changes and resubmit it for acceptance within five (5) working days certifying in writing that all information contained in it complies with the contract requirements. Upon notification by the District of acceptance of the CPM network, the DBE shall prepare computer plots (36" x 48") and printouts (8 ½" x 11"), and complete its submission of the Baseline Schedule, which shall include the following:

9.3.7.1 Bar Charts generated using the format template provided by the District for:

9.3.7.1.1 Project Milestones only;

9.3.7.1.2 Summary Level (sorted by craft/trade and area);

9.3.7.1.3 Detail (sorted by Early Dates); and

9.3.7.1.4 Detail (sorted by Responsibility).

9.3.7.2 Reports generated separately using the format template, if any, provided by the District for:

9.3.7.2.1 Float (sorted low to high);

9.3.7.2.2 Resource histogram; and

9.3.7.2.3 Cost Summary and Cash flow Projection.

9.3.7.3 Activities shall be coded to the activity code structure, if any, provided to the DBE by the District.

9.3.7.4 Once accepted by the District, this schedule shall become the Baseline Schedule for the Project from which all future Progress Schedules will be generated.

9.3.8 DBE Progress Schedule. Each month, in conjunction with the application for payment process, the DBE and District will conduct monthly reviews to determine: "planned" versus "actual" progress to date; compliance with contract submittal requirements, Project Milestones and the accepted Baseline Schedule; and determination of any changes to the work plan or implementation which must be made by the DBE to comply with the Baseline Schedule. The monthly schedule review shall include, at a minimum:

9.3.8.1 Monthly update/status of electronic database shall include recording of all Actual Start Dates and Actual Finish Dates and status of activities in progress.

9.3.8.2 Review of "Planned" versus "Actual" work force allocations and progress for the preceding month.

9.3.8.3 Reviews of revisions added or deleted work and how those activities are being integrated into the DBE's work plan.

9.3.8.4 Review of DBE's interface and coordination with other work on the Project.

9.3.8.5 Review of all impacts to the work during the preceding month and to date, DBE evaluation of those impacts and any recovery plans or remedial actions required to comply with the Baseline Schedule.

9.3.8.6 Following the review of the above and all other information relevant to the progress of the work, the DBE shall adjust its work plan as required to ensure compliance with the Baseline Schedule. The requirement for additional work force allocations, additional shifts, overtime, etc., will not entitle DBE to additional compensation except to the extent expressly provided for by this Agreement or Change Order. The Progress Schedule shall be updated and submitted monthly for the District's review concurrent with each payment application submitted by the DBE. The schedule update shall incorporate actual status to date and shall include the following:

9.3.8.6.1 Computer plotted time-scaled CPM network (36" x 48") in color;

9.3.8.6.2 Bar Charts generated separately using the format template provide by the District for:

9.3.8.6.2.1 Project Milestones only (Baseline vs. forecast);

9.3.8.6.2.2 Summary Level (sorted by craft/trade and area);

9.3.8.6.2.3 Detail (sorted by Early Dates); and

9.3.8.6.2.4 Detail (sorted by Responsibility).

9.3.8.6.3 Reports generated separately using the format template provided by the District for:

9.3.8.6.3.1 Variance (Baseline vs. forecast);

9.3.8.6.3.2 Progress Curves (Baseline vs. Earned/Forecast);

9.3.8.6.3.3 Float (sorted low to high); and

9.3.8.6.3.4 Resource histogram.

The Progress Schedule will be the basis for the Short-Term Schedule.

9.3.9 DBE Short-Term Schedule. The Short-Term Schedule shall address activities over an eight-week period. This schedule shall be maintained on a weekly basis and used as a means of compensating for negative effects of as many variables as possible. It shall be directly derived and electronically tied to the Baseline Schedule to enable rapid analysis of impacts of short-term schedule changes on the overall Project time line.

9.3.9.1 The Short-Term Schedule is a dynamic schedule whose activities can vary in both duration and precedence, but only between two sequential milestones as described in the accepted Baseline Schedule. Upon the District's acceptance of the Baseline Schedule, the DBE shall begin providing an updated Short-Term Schedule for all participants at each weekly progress meeting or on a weekly basis if the District decides weekly meetings are not required. The interval format shall be a seven-week projection that shall include one (1) week prior, the week submitted, and six (6) weeks thereafter.

9.3.10 Schedule Revisions. The implementation of revised schedule logic and/or activity duration estimates for updating a schedule whether furnished by the DBE or the District do not constitute an extension of Contract Time, relaxation of Project Milestones or basis for a change to the GMP. Such revisions are for the purpose of maintaining the accuracy of the schedule's representation of the work to be accomplished and to present best duration estimates for work yet to be performed.

9.3.11 Graphical Information. The DBE shall prepare professional-quality graphical presentations of such scheduling and/or sequencing information as

may be required to communicate its work plans or to effectively implement its coordination obligations under the contract.

9.4 Float Time

Float or slack is the amount of time between the early start date and the late start date, or the early finish date and the late finish date, of any of the activities in the schedule. All float time contained in the Work shall be shared between the District and DBE, but its use shall be determined by the District. Under no circumstances shall DBE be entitled to maintain a claim against the District for DBE's failure to achieve either Substantial Completion or Final Completion on a date earlier than that set forth on said Project Milestone Schedule as the same may be adjusted by approved Change Orders.

9.5 Computation of Time / Adverse Weather

9.5.1 The DBE will only be allowed a time extension for Adverse Weather conditions if requested by DBE in compliance with the time extension request procedures and only if all of the following conditions are met:

9.5.1.1 The weather conditions constitute Adverse Weather, as defined herein.

9.5.1.2 DBE can verify that the Adverse Weather caused delays in excess of five (5) hours of the indicated labor required to complete the scheduled tasks of Work on the day affected by the Adverse Weather.

9.5.1.3 The DBE's crew is dismissed as a result of the Adverse Weather;

9.5.1.4 Said delay adversely affects the critical path in the Baseline Schedule; and

9.5.1.5 Exceeds twelve (12) days of delay per year.

9.5.2 If the aforementioned conditions are met, a non-compensable day-for-day extension will only be allowed for those days in excess of those indicated herein.

9.5.3 The DBE shall work seven (7) days per week, if necessary, irrespective of inclement weather, to maintain access and the Baseline Schedule, and to protect the Work under construction from the effects of Adverse Weather, all at no further cost to the District.

9.5.4 The Contract Time has been determined with consideration given to the average climate weather conditions prevailing in the County in which the Project is located.

10. EXTENSIONS OF TIME – LIQUIDATED DAMAGES

10.1 Liquidated Damages

DBE 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 completed within the time specified in the Contract Documents, it is understood that the District will suffer damage. It being impractical and unfeasible to determine the amount of actual damage, it is agreed the DBE shall pay to District as fixed and liquidated damages the sum of Three Thousand Dollars ($3,500) per day as liquidated damages for each and every day's delay beyond the date scheduled for Substantial Completion as defined by this Contract. It is further agreed that after Substantial Completion, the DBE shall pay to District as fixed and liquidated damages the sum of Two Thousand Dollars ($1,500) per day for each and every day of delay beyond the date scheduled for Final Completion as defined by this Contract. It is hereby understood and agreed that this amount is not a penalty. DBE and its Surety shall be liable for the amount thereof pursuant to Government Code section 53069.85.

10.2 Excusable Delay

10.2.1 DBE shall not be charged for liquidated damages because of any delays in completion of Work which are not the fault of DBE or its Subcontractors, including, without limitation, acts of God as defined in Public Contract Code section 7105, acts of enemy, epidemics, and quarantine restrictions. DBE shall, within five (5) calendar days of beginning of any delay, notify District in writing of causes of delay including documentation and facts explaining the delay and the direct correlation between the cause and effect. District shall review the facts and extent of any delay and shall grant extension(s) of time for completing Work when, in its judgment, the findings of fact justify an extension. Extension(s) 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 if DBE has timely submitted the Baseline Schedule as required herein.

10.2.2 DBE shall notify the District pursuant to the claims provisions in this Agreement of any anticipated delay and its cause. Following submission of a claim, the District 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.

10.2.3 In the event the DBE 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. When requesting time, requests must be submitted with full justification and documentation. If the DBE fails to submit justification, it waives its right to a time extension at a later date. Such justification must be based on the official Baseline Schedule as updated at the time of occurrence of the delay or execution of Work related to any changes to the Scope of Work. Any claim for delay must include the following information as support, without limitation:

10.2.3.1 The duration of the activity relating to the changes in the Work and the resources (manpower, equipment, material, etc.) required to perform the activities within the stated duration.

10.2.3.2 Specific logical ties to the Baseline Schedule for the proposed changes and/or delay showing the activity/activities in the

Baseline Schedule that are affected by the change and/or delay. In particular, DBE must show an actual impact to the schedule, after making a good faith effort to mitigate the delay by rescheduling the work, by providing an analysis of the schedule ("Schedule Analysis"). Such Schedule Analysis shall describe in detail the cause and effect of the delay and the impact on the critical dates in the Project schedule. (This information must be provided for any portion of any delay of seven (7) days or more.)

10.2.3.3 A recovery schedule must be submitted within twenty (20) calendar days of written notification to the District of causes of delay.

10.3 No Additional Compensation for Delays within DBE's Control

10.3.1 DBE is aware that governmental agencies and utilities, including, without limitation, the Division of the State Architect, the Department of General Services, gas companies, electrical utility companies, water districts, and other agencies may have to approve DBE-prepared drawings or approve a proposed installation. Accordingly, DBE has included in the GMP, time for possible review of its drawings and for reasonable delays and damages that may be caused by such agencies, including without limitation delays due to California Environmental Quality Act ("CEQA") compliance. Thus, DBE is not entitled to make a claim for damages for delays arising from the review of DBE's drawings.

10.3.1.1 DBE shall only be entitled to compensation for delay when all of the following conditions are met:

10.3.1.1.1 The District is responsible for the delay.

10.3.1.1.2 The delay is unreasonable under the circumstances involved.

10.3.1.1.3 The delay was not within the contemplation of District and DBE;

10.3.1.1.4 The delay could not have been avoided or mitigated by DBE's reasonable diligence; and

10.3.1.1.5 DBE timely complies with the claims procedure of the Contract Documents.

10.3.2 Where a change in the Work extends the Contract Time, DBE may request and recover additional, actual direct costs, provided that DBE can demonstrate such additional costs are:

10.3.2.1 Actually incurred performing the Work;

10.3.2.2 Not compensated by the Markup allowed; and

10.3.2.3 Directly result from the extended Contract Time.

DBE shall comply with all required procedures, documentation and time requirements in the Contract Documents. DBE may not seek or recover such costs using formulas (e.g. Eichleay, labor factors)

11. CHANGES IN THE WORK

11.1 General

11.1.1 The District may order changes, including but not limited to, revisions to the Construction Documents, performance of extra work, and the elimination of work. Orders for such changes will be in writing. Changes shall not affect the obligations of the sureties on the contract bonds nor require their consent. The DBE shall notify the District for their evaluation whenever it appears a change is necessary. Contract Time and GMP will be adjusted by written Change Order for changes materially increasing or decreasing the time for performance or cost.

11.1.2 The DBE, when ordered by the District, shall proceed with changes before agreement is reached on adjustment in compensation or time for performance, and shall furnish to the District records as specified in this Agreement.

11.1.3 If the DBE fails to provide such records, the District's records will be used for the purpose of adjustment in Contract Time and GMP.

11.2 Change Orders

11.2.1 Methods used in determining the value of a Change Order shall be based on one of the following methods:

11.2.1.1 By mutual acceptance of a lump sum increase or decrease in costs. Upon the District's written request, the DBE shall furnish a detailed estimate of increase or decrease in costs, together with cost breakdowns of labor, materials and equipment and other support data within the time specified in such request. Cost breakdowns shall include, but are not limited to: hourly labor rates and hours; materials quantities and unit costs; and equipment hourly rates and hours, as an example. The DBE shall be responsible for any additional costs caused by the DBE's failure to provide the estimate within the time specified.

11.2.1.2 By the District, on the basis of the District's estimate of increase or decrease in the costs.

11.2.1.3 By the District, whether or not negotiations are initiated as provided in this Agreement.

11.2.1.4 By actual and necessary costs, as determined by the District, on the basis of supporting documents submitted by DBE. Beginning with the first day and at the end of each day, the DBE shall furnish to the District detailed hourly records for labor, construction equipment, and services; and itemized records of materials and equipment used that day in performance of the changes. Provide hourly rates for all include design professionals, contractor

management staff both on site and office and other consultants performing services on this project. Such records shall be in a format approved by the District. Such records shall be signed by the DBE and verified by the District.

11.2.1.5 By a manner agreed upon by the District and the DBE.

11.2.2 Allowable Costs. If an increase or decrease cannot be agreed to, the method for determining the value of the Change Order shall be computed in the following manner:

11.2.2.1 Mark-Ups for Added Work.

11.2.2.1.1 Professional Services: Compensation for professional architectural/engineering services shall be chargeable not to exceed the rates agreed to between the District and the DBE.

11.2.2.1.2 For work by DBE. DBE may add as mark-up to totals of authorized allowable costs, an amount not to exceed the following percentages:

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	DBE PERFORMED WORK	
(a)	**Material** (attach supplier's invoice or itemized quantity and unit cost plus sales tax)	
(b)	**Add Labor** (attach itemized hours and rates, fully encumbered)	
(c)	**Add Equipment** (attach suppliers' invoice)	
(d)	**Add General Conditions, if Time Compensable** (attach invoices)	
(e)	**Subtotal**	
(f)	**Add DBE's Overhead and Profit,** not to exceed Fifteen percent (15%) of **Item (d).**	
(g)	**Subtotal**	
(h)	**Add Bond and Insurance,** not to exceed Two percent (2%) of **Item (f)**	
(i)	**TOTAL**	
(j)	**Time** (zero unless indicated; "TBD" not permitted)	**__ Calendar Days**

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11.2.2.1.3 For work by Subcontractors. Actual cost to the DBE for Work performed by the Subcontractor. The Subcontractor will compute costs as follows, except that the aggregate mark-ups made as all Subcontractor tiers mist not exceed the following percentages:

	SUBCONTRACTOR PERFORMED WORK	
(a)	**Material** (attach supplier's invoice or itemized quantity and unit cost plus sales tax)	
(b)	**Add Labor** (attach itemized hours and rates, fully Encumbered)	
(c)	**Add Equipment** (attach suppliers' invoice)	
(d)	**Subtotal**	
(e)	**Add Overhead and Profit for any and all tiers of Subcontractor**, the total not to exceed Ten percent (10%) of **Item (d)**	
(f)	**Subtotal**	
(g)	**Add General Conditions, if Time Compensable** (attach invoices)	
(h)	**Subtotal**	
(i)	**Add DBE's Overhead and Profit,** not to exceed Fifteen percent (15%) of **Item (h).**	
(j)	**Subtotal**	
(k)	**Add Bond and Insurance,** not to exceed Two (2%) of **Item (j)**	
(l)	**TOTAL**	
(m)	**Time** (zero unless indicated; "TBD" not permitted)	**__ Calendar Days**

11.2.2.1.4 For deleted work: All deductive Change Order(s) must be prepared pursuant to the provisions herein. Where a portion of the Work is deleted from the Contract, the reasonable value of the deleted work less the value of any new work performed shall be considered the appropriate deduction. The value submitted on the SOV shall be used to calculate the credit amount unless the bid documentation is being held in escrow as part of the Contract Documents. If DBE offers a

proposed amount for a deductive Change Order(s) for work performed directly by the DBE, DBE shall include a minimum of Fifteen percent (15%) total profit and overhead to be deducted with the amount of the work of the Change Order(s). If Subcontractor work is involved, Subcontractors shall include a minimum of ten percent (10%) profit and overhead to be deducted with the amount of its deducted work and DBE shall include a minimum of Fifteen percent (15%). Any deviation from this provision shall not be allowed.

11.2.2.1.5 For Change Orders that involve both added and deleted work, the GMP will be adjusted based on the following computation: Costs before mark-ups of added and deleted work must each be separately estimated. If a difference between costs results in an increase to the GMP, a mark-up for Added Work will be applied to the difference. If a difference in costs results in a decrease, then the mark-up for the deleted Work will be applied to the difference.

11.2.3 Direct Costs:

11.2.3.1 Labor

DBE shall be compensated for the costs of labor actually and directly utilized in the performance of the Work. Such labor costs shall be limited to field labor for which there is a prevailing wage rate classification the actual cost, use of any formulas (e.g. labor factors) is not allowed, not to exceed prevailing wage rates in the locality of the Site and shall be in fully Encumbered. Wage rates for labor shall not exceed the prevailing wage rates in the locality of the Site and shall be in the labor classification(s) necessary for the performance of the Work. Labor costs shall exclude costs incurred by the DBE in preparing estimate(s) of the costs of the change in the Work, in the maintenance of records relating to the costs of the change in the Work, coordination and assembly of materials and information relating to the change in the Work or performance thereof, or the supervision and other overhead and general conditions costs associated with the change in the Work or performance thereof, including but not limited to the cost for the job superintendent.

11.2.3.2 Material

The District shall pay only the actual cost to the DBE for the materials directly required for the performance of the changed work. Such cost of materials may include the cost of transportation and no delivery charges will be allowed unless the delivery is specifically for the changed work. If a trade discount by an actual supplier is available to the DBE, it shall be credited to the District. If the materials are obtained from a supplier or source owned wholly by or in part by the DBE, payment thereof will not exceed the current wholesale price for the materials. The term "trade discount" includes the concept of cash discounting.

If in the opinion of the District, the cost of the materials is excessive or if the DBE fails to furnish satisfactory evidence of a cost to him other from the actual supplier, then, in either case, the cost of the materials shall be deemed to be the lowest current wholesale price at which similar materials are available in the quantities required. The District reserves the right to furnish such materials, as it deems advisable and the DBE shall have no claims for cost or profits on materials furnished by the District.

11.2.3.3 Equipment

The District shall pay only the actual cost to the DBE for the use of equipment directly required in the performance of the changed work. In computing the hourly rental of equipment, any time less than thirty (30) minutes shall be considered one-half hour. No payment will be made for time while equipment is inoperative due to breakdown or for non-workdays. In addition, the rental time shall not include the time required to move the equipment to the work for rental of such equipment and to return it to the source.

No mobilization or demobilization will be allowed for equipment already on site. If such equipment is not moved by its own power, then loading and transportation costs will be paid in lieu of rental time thereof. However, neither moving time nor loading and transportation costs will be paid if the equipment is used on the Project in any other way than upon the changed work. Individual pieces of equipment having a replacement value of $1,000 or less shall be considered to be small tools or small equipment and no payment will be made therefore.

The rental rate for equipment will not exceed that as recommended by the lower of the rental rates established by distributors or equipment rental agencies or as contained in the Association of Equipment Distributors (AED) book in the locality for performance of the changes. For equipment owned, furnished, or rented by the DBE no cost thereof shall be recognized in excess of the rental rates established by distributors or equipment rental agencies and/or the AED or any tier book in the locality for performance of the changes. The amount to be paid to the DBE for the use of equipment as set forth above shall constitute full compensation to the DBE for the cost of fuel, power, oil, lubricants, supplies, small tools, small equipment, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, labor (except for equipment operators) and any and all costs to the DBE incidental to the use of the equipment.

11.2.3.4 Overhead and Profit.

The phrase "Overhead and Profit" shall include field and office supervisors and assistants, bonds and insurance other than percentage/rates for bonds and insurance required herein, and general field and home office expenses.

11.2.3.5 General Conditions Cost.

The phrase "General Conditions Cost" shall mean, other than expressly limited or excluded herein, the costs of DBE during the Construction Phase, including but not limited to: payroll costs for project manager for Work conducted at the Site, payroll costs for the superintendent and full-time general foremen, workers not included as direct labor costs engaged in support functions (e.g., loading/unloading, clean-up), costs of offices and temporary facilities including office materials, office supplies, office equipment, minor expenses, utilities, fuel, sanitary facilities and telephone services at the Site, costs of consultants not in the direct employ of DBE or Subcontractors, and fees for permits and licenses."

11.3 Acceptance of Change Orders

The DBE's written acceptance of a Change Order shall constitute final and binding agreement to the provisions of it and a waiver of all claims in connection with it, whether direct, indirect, or consequential in nature. The District's form shall control, and no annotations or handwritten notes by DBE shall be effective upon its execution.

A Change Order will become effective when approved by the Board, notwithstanding that DBE has not signed it, provided that District indicates it as a "Unilateral Change Order". Any dispute as to the adjustment in the GMP or Contract Time, if any, of the Unilateral Change Order shall be resolved pursuant to the Payment and Claims and Disputes provisions herein.

11.4 Effect on Sureties

All alterations, extensions of time, extra and additional work, and other changes authorized by the Contract Documents may be made without securing consent of surety(s).

11.5 Covering and Uncovering of Work

11.5.1 When inspections are required by the Contract Documents the DBE shall notify the District two (2) working days prior to covering any work.

11.5.2 If a portion of the Work is covered prior to the District's review, it shall, if requested in writing by the District, be uncovered for the District's observation and replaced at the DBE's expense without change in the Contract Time.

11.6 Correction of Work

11.6.1 The DBE shall promptly correct work rejected by the District or failing to conform to the requirements of the Contract Documents, whether or not fabricated, installed, or completed. The DBE shall bear the costs of correcting such rejected work, including additional testing and inspections required and compensation for the District's services and expenses made necessary thereby.

11.6.2 Notwithstanding DBE's Guarantee, in the event of an emergency constituting an immediate hazard to the health or safety of District employees, property, or licensees, the District may undertake, at the DBE's expense and without prior notice, all work necessary to correct such hazardous condition(s) when it was caused by work of the DBE not being in accordance with requirements of the Contract Documents.

11.6.3 The DBE shall remove from the Project site portions of the Work that are not in accordance with the requirements of the Contract Documents, and are neither corrected by the DBE nor accepted by the District.

11.6.4 If the DBE fails to correct nonconforming work, the District may correct the nonconforming work in accordance with District Remedies. If the DBE does not proceed with correction of such nonconforming work, within such time fixed by written notice from the District, the District may remove and store all salvageable materials articles and/or equipment at the DBE's expense.

11.6.5 If the DBE does not pay all costs of such removal and storage within fourteen (14) days after written notice, the District may, upon fourteen (14) additional days written notice, sell such materials articles and/or equipment at an auction or private sale, and shall account for the proceeds, after deducting costs and damages that would have been borne by the DBE, including compensation for the District's services and expenses made necessary by it. If the proceeds of a sale do not cover all costs that the DBE would have borne, the GMP shall be reduced by the deficiency. If payments then or thereafter due the DBE are not sufficient to cover such amount, the DBE shall pay the difference to the District.

11.6.6 The DBE shall bear the cost of correcting destroyed or damaged work executed by the District or separate contractors, whether fully completed or partially completed, which is caused by the DBE's correction or removal of Work that is not in accordance with requirements of the Contract Documents.

11.6.7 Nothing contained in this paragraph, shall be construed to establish a period of limitation with respect to other obligations that the DBE might have in the Contract Documents. Establishment of the time period of two (2) year, Guarantee, relates only to the specific obligation of the DBE to correct the Work, and has no relationship to the time within which the obligation to comply with requirements of the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the DBE's liability with respect to the DBE's obligations other than specifically to correct the Work.

11.7 Acceptance of Nonconforming Work

If the District prefers to accept any or all of the Work that is not in accordance with requirements of the Contract Documents, the District may do so instead of requiring its correction and/or removal, in which case the GMP will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not Final Payment to the DBE has been made.

12. TERMINATION AND SUSPENSION

12.1 District's Request for Assurances

If District at any time reasonably believes DBE is or may be in default under this Contract, District may in its sole discretion notify DBE of this fact and request written assurances from DBE of performance of Work and a written plan from DBE to remedy any potential default under the terms this Contract that the District may advise DBE of in writing. DBE shall, within ten (10) calendar days of District's request, deliver a written cure plan that meets the District's requirements in its request for assurances. DBE's failure to provide such written assurances of performance and the required written plan, within ten (10) calendar days of request, will constitute a material breach of this Contract sufficient to justify termination for cause.

12.2 District's Right to Terminate DBE for Cause

12.2.1 Grounds for Termination: The District, in its sole discretion, may terminate the Contract and/or terminate the DBE's right to perform the work of the Contract based upon any of the following:

12.2.1.1 DBE refuses or fails to execute the Work or any separable part thereof with sufficient diligence as will ensure its completion within the time specified or any extension thereof, or

12.2.1.2 DBE fails to complete said Work within the time specified or any extension thereof, or

12.2.1.3 DBE persistently fails or refuses to perform Work or provide material of sufficient quality as to be in compliance with Contract Documents; or

12.2.1.4 DBE persistently refuses, or repeatedly fails, except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials to complete the Work in the time specified; or

12.2.1.5 DBE fails to make prompt payment to Subcontractors, or for material, or for labor; or

12.2.1.6 DBE persistently disregards laws, or ordinances, or instructions of District; or

12.2.1.7 DBE fails to supply labor, including that of Subcontractors, that is sufficient to prosecute the Work or that can work in harmony with all other elements of labor employed or to be employed on the Work; or

12.2.1.8 DBE or its Subcontractor(s) is/are otherwise in breach, default, or in substantial violation of any provision of this Contract, including but not limited to a lapse in licensing or registration.

12.2.2 Notification of Termination

12.2.2.1 Upon the occurrence at District's sole determination of any of the above conditions, District may, without prejudice to any other right or remedy, serve written notice upon DBE and its Surety of District's termination of this Contract and/or the DBE's right to perform the work of the Contract. This notice will contain the reasons for termination. Unless, within three (3) days after the service of the notice, any and all condition(s) shall cease, and any and all violation(s) shall cease, or arrangement satisfactory to District for the correction of the condition(s) and/or violation(s) be made, this Contract and/or the DBE's right to perform the Work of the Contract shall cease and terminate. Upon termination, DBE shall not be entitled to receive any further payment until the entire Work is finished.

12.2.2.2 Upon termination, District may immediately serve written notice of tender upon Surety whereby Surety shall have the right to take over and perform this Contract only if Surety:

12.2.2.2.1 Within three (3) days after service upon it of the notice of tender, gives District written notice of Surety's intention to take over and perform this Contract; and

12.2.2.2.2 Commences performance of this Contract within three (3) days from date of serving of its notice to District.

12.2.2.3 Surety shall not utilize DBE in completing the Project if the District notifies Surety of the District's objection to DBE's further participation in the completion of the Project. Surety expressly agrees that any contractor which Surety proposes to fulfill Surety's obligations is subject to District's approval. District's approval shall not be unreasonably withheld, conditioned or delayed.

12.2.2.4 If Surety fails to notify District or begin performance as indicated herein, District may take over the Work and execute the Work to completion by any method it may deem advisable at the expense of DBE and/or its Surety. DBE and/or its Surety shall be liable to District for any excess cost or other damages the District incurs thereby. Time is of the essence in this Contract. If the District takes over the Work as herein provided, District may, without liability for so doing, take possession of and utilize in completing the Work such materials, appliances, plan, and other property belonging to DBE as may be on the Site of the Work, in bonded storage, or previously paid for.

12.3 Termination of DBE for Convenience

12.3.1 District in its sole discretion may terminate the Contract and/or terminate the DBE's right to perform the work of the Contract in whole or in part upon three (3) days' written notice to the DBE.

12.3.2 Upon notice, DBE shall:

12.3.2.1 Cease operations as directed by the District in the notice;

12.3.2.2 Take necessary actions for the protection and preservation of the Work as soon as possible; and

12.3.2.3 Terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

12.3.3 Within 30 days of the notice, DBE submit to the District a payment application for the actual cost for labor, materials, and services performed, including all DBE's and Subcontractor(s)' mobilization and/or demobilization costs, that is unpaid. DBE shall have no claims against the District except for the actual cost for labor, materials, and services performed that adequately documented through timesheets, invoices, receipts, or otherwise. District shall pay all undisputed invoice(s) for work performed until the notice of termination.

12.3.4 Under a termination for convenience, the District retains the right to all the options available to the District if there is a termination for cause.

12.4 Effect of Termination

12.4.1 DBE shall, only if ordered to do so by the District, immediately remove from the Site all or any materials and personal property belonging to DBE that have not been incorporated in the construction of the Work, or which are not in place in the Work. The District retains the right, but not the obligation, to keep and use any materials and personal property belonging to DBE that have not been incorporated in the construction of the Work, or which are not in place in the Work. The DBE and its Surety shall be liable upon the Performance Bond for all damages caused to the District by reason of the DBE's failure to complete the Contract.

12.4.2 In the event that the District shall perform any portion of, or the whole of the Work, the District shall not be liable nor account to the DBE in any way for the time within which, or the manner in which, the Work is performed by the District or for any changes the District may make in the Work or for the money expended by the District in satisfying claims and/or suits and/or other obligations in connection with the Work.

12.4.3 In the event termination for cause is determined to have not been for cause, the termination shall be deemed to have been a termination for convenience effective as of the same date as the purported termination for cause.

12.4.4 In the event that the Contract is terminated for any reason, no allowances or compensation will be granted for the loss of any anticipated profit by the DBE or any impact or impairment of DBE's bonding capacity.

12.4.5 If the expense to the District to finish the Work exceeds the unpaid GMP, DBE and Surety shall pay difference to District within twenty-one (21) days of District's request.

12.4.6 The District shall have the right (but shall have no obligation) to assume and/or assign to a general contractor or construction manager or other third party who is qualified and has sufficient resources to complete the

Work, the rights of the DBE under its subcontracts with any or all Subcontractors. In the event of an assumption or assignment by the District, no Subcontractor shall have any claim against the District or third party for Work performed by Subcontractor or other matters arising prior to termination of the Contract. The District or any third party, as the case may be, shall be liable only for obligations to the Subcontractor arising after assumption or assignment. Should the District so elect, the DBE shall execute and deliver all documents and take all steps, including the legal assignment of its contractual rights, as the District may require, for the purpose of fully vesting in the District the rights and benefits of its Subcontractor under Subcontracts or other obligations or commitments. All payments due the DBE hereunder shall be subject to a right of offset by the District for expenses and damages suffered by the District as a result of any default, acts, or omissions of the DBE. DBE must include this assignment provision in all of its contracts with its Subcontractors.

12.4.7 The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to District.

12.5 Emergency Termination of Public Contracts Act of 1949

12.5.1 This Contract is subject to termination as provided by sections 4410 and 4411 of the Government Code of the State of California, being a portion of the Emergency Termination of Public Contracts Act of 1949.

12.5.1.1 Section 4410 of the Government Code states:

In the event a national emergency occurs, and public work, being performed by contract, is stopped, directly or indirectly, because of the freezing or diversion of materials, equipment or labor, as the result of an order or a proclamation of the President of the United States, or of an order of any federal authority, and the circumstances or conditions are such that it is impracticable within a reasonable time to proceed with a substantial portion of the work, then the public agency and the contractor may, by written agreement, terminate said contract.

12.5.1.2 Section 4411 of the Government Code states:

Such an agreement shall include the terms and conditions of the termination of the contract and provision for the payment of compensation or money, if any, which either party shall pay to the other or any other person, under the facts and circumstances in the case.

12.5.2 Compensation to the DBE shall be determined at the sole discretion of District on the basis of the reasonable value of the Work done, including preparatory work. As an exception to the foregoing and at the District's discretion, in the case of any fully completed separate item or portion of the Work for which there is a separate previously submitted unit price or item on the accepted schedule of values, that price shall control. The District, at its sole discretion, may adopt the GMP as the reasonable value of the work done or any portion thereof.

12.6 Suspension of Work

12.6.1 District in its sole discretion may suspend, delay or interrupt the Work in whole or in part for such period of time as the District may determine upon three (3) days written notice to the DBE.

12.6.1.1 An adjustment may be made for changes in the cost of performance of the Work caused by any such suspension, delay or interruption. No adjustment shall be made to the extent:

12.6.1.1.1 That performance is, was or would have been so suspended, delayed or interrupted by another cause for which DBE is responsible; or

12.6.1.1.2 That an equitable adjustment is made or denied under another provision of the Contract; or

12.6.1.1.3 That the suspension of Work was the direct or indirect result of DBE's failure to perform any of its obligations hereunder.

Any adjustments in cost of performance may have a fixed or percentage fee as provided in the section on Format for Proposed Change Order herein. This amount shall be full compensation for all DBE's and its Subcontractor(s)' changes in the cost of performance of the Contract caused by any such suspension, delay or interruption.

13. DISPUTES AND CLAIMS

13.1 Performance during Claim Process

DBE and its Subcontractors shall continue to perform its Work under the Contract and shall not cause a delay of the Work during any dispute, claim, negotiation, mediation, or arbitration proceeding, except by written agreement by the District.

13.2 Definition of Claim

13.2.1 Pursuant to Public Contract Code section 9204, the term "Claim" means a separate demand by the DBE sent by registered mail or certified mail with return receipt requested, for one or more of the following:

13.2.2 A time extension, including without limitation, for relief of damages or penalties for delay assessed by the District under the Contract;

13.2.2.1 Payment by the District of money or damages arising from work done by, or on behalf of, the DBE pursuant to the Contract and payment of which is not otherwise expressly provided for or to which DBE is not otherwise entitled to; or

13.2.2.2 An amount of payment disputed by the District.

13.3 Claims Presentation

13.3.1 If DBE intends to apply for an increase in the GMP or Contract Time for any reason including, without limitation, the acts of District or its agents, DBE shall, within thirty (30) days after the event giving rise to the Claim, give notice of the Claim in writing, including an itemized statement of the details and amounts of its Claim for any increase in the GMP or time requested, including a Schedule Analysis and any and all other documentation substantiating DBE's claimed damages. Otherwise, DBE shall have waived and relinquished its dispute against the District and DBE's claims for compensation or an extension of time shall be forfeited and invalidated.

13.3.2 The Claim shall identify:

13.3.2.1 The issues, events, conditions, circumstances and/or causes giving rise to the dispute;

13.3.2.2 Citation to provisions in the Contract Documents, statute sections, and/or case law entitling DBE to an increase in the GMP or Contract Time;

13.3.2.3 The pertinent dates and/or durations and actual and/or anticipated effects on the GMP, Project Schedule Milestones and/or Contract Time adjustments;

13.3.2.4 The Time Impact Analysis of all time delays that shows actual time impact on the critical path; and

13.3.2.5 The line-item costs for labor, material, and/or equipment, if applicable, for all cost impacts priced like a change order and must be updated monthly as to cost and entitlement if a continuing claim; or

13.3.2.6 A request by DBE, if any, to waive the claims procedure under Public Contract Code section 9204 and proceed directly to the commencement of a civil action or binding arbitration.

13.3.3 The Claim shall include the following certification by the DBE:

13.3.3.1 The undersigned DBE certifies under penalty of perjury that the attached dispute is made in good faith; that the supporting data is accurate and complete to the best of my knowledge and belief; that the amount requested accurately reflects the adjustment for which DBE believes the District is liable; and that I am duly authorized to certify the claim on behalf of the DBE.

13.3.3.2 Furthermore, DBE understands that the value of the attached dispute expressly includes any and all of the DBE's costs and expenses, direct and indirect, resulting from the Work performed on the Project, additional time required on the Project and/or resulting from delay to the Project including, without limitation, cumulative impacts. DBE may not separately recover for overhead or other indirect costs. Any costs, expenses, damages, or time extensions not included are deemed waived.

13.3.4 DBE shall bear all costs incurred in the preparation and submission of a claim.

13.3.5 Failure to timely submit a claim and the requisite supporting documentation shall constitute a waiver of DBE's claim(s) against the District and DBE's claims for compensation or an extension of time shall be forfeited and invalidated.

13.4 Claim Resolution pursuant to Public Contract Code section 9204

DBE may request to waive the claims procedure under Public Contract Code section 9204 and proceed directly to the commencement of a civil action or binding arbitration. If DBE chooses to proceed, DBE shall comply with the following steps:

13.4.1 STEP 1:

13.4.1.1 Upon receipt of a Claim by registered or certified mail, return receipt requested, including the documents necessary to substantiate it, the District shall conduct a reasonable review of the Claim and, within a period **not to exceed 45 days**, shall provide the DBE a written statement identifying what portion of the Claim is disputed and what portion is undisputed. Upon receipt of a Claim, the District and DBE may, **by mutual agreement**, extend the time period to provide a written statement. If the District needs approval from its governing body to provide the DBE a written statement identifying the disputed portion and the undisputed portion of the Claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of Claim sent by registered mail or certified mail, return receipt requested, the District shall have **up to three (3) days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension**, expires to provide DBE a written statement identifying the disputed portion and the undisputed portion.

13.4.1.1.1 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. Amounts not paid in a timely manner as required by this section shall bear interest at seven percent (7%) per annum.

13.4.1.2 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. In this instance, District and DBE must comply with the sections below regarding Public Contract Code section 20104 et seq. and Government Code Claim Act Claims.

13.4.1.3 If the District fails to issue a written statement, or to otherwise meet the time requirements of this section, this 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 section,

shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of DBE.

13.4.2 STEP 2:

13.4.2.1 If DBE disputes the District's written response, or if the District fails to respond to a Claim within the time prescribed, DBE 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 dispute. 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 DBE a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed.

13.4.2.2 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. Amounts not paid in a timely manner as required by this section shall bear interest at seven percent (7%) per annum.

13.4.3 STEP 3:

13.4.3.1 Any disputed portion of the claim, as identified by DBE in writing, shall be submitted to nonbinding mediation, with the District and DBE sharing the associated costs equally. The District and DBE 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 outside this section.

13.4.3.1.1 For purposes of this section, 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.

13.4.3.2 Unless otherwise agreed to by the District and DBE in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Public Contract Code section 20104.4 to mediate after litigation has been commenced.

13.4.4 STEP 4:

13.4.4.1 If mediation under this section does not resolve the parties' dispute, the District may, but does not require arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program.

13.5 Subcontractor Pass-Through Claims

13.5.1 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 DBE 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.

13.5.2 Within 45 days of receipt of this written request from a Subcontractor, DBE shall notify the Subcontractor in writing as to whether the DBE presented the Claim to the District and, if DBE did not present the Claim, provide the Subcontractor with a statement of the reasons for not having done so.

13.5.3 DBE shall bind all its Subcontractors to the provisions of this section and will hold the District harmless against Claims by Subcontractors.

13.6 Government Code Claim Act Claim

13.6.1 If a Claim, or any portion thereof, remains in dispute upon satisfaction of all applicable Claim Resolution requirements, including those pursuant to Public Contract Code section 9204, the DBE shall comply with all claims presentation requirements as provided in Chapter 1 (commencing with section 900) and Chapter 2 (commencing with section 910) of Part 3 of Division 3.6 of Title 1 of Government Code as a condition precedent to the DBE's right to bring a civil action against the District.

13.6.2 DBE shall bear all costs incurred in the preparation, submission and administration of a Claim. Any claims presented in accordance with the Government Code must affirmatively indicate DBE's prior compliance with the claims procedure herein of the claims asserted.

13.6.3 For purposes of those provisions, the running of the time within which a claim pursuant to Public Contract Code section 20104.2 only must be presented to the District shall be tolled from the time the claimant submits his or her written claim pursuant to subdivision (a) until the time that claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

13.7 Claim Resolution pursuant to Public Contract Code section 20104 et seq.

13.7.1 In the event of a disagreement between the parties as to performance of the Work, the interpretation of this Contract, or payment or nonpayment for Work performed or not performed, the parties shall attempt to resolve all

claims of three hundred seventy-five thousand dollars ($375,000) or less which arise between DBE and District by those procedures set forth in Public Contract Code section 20104 et seq., to the extent applicable.

13.7.1.1 DBE shall file with the District any written Claim, including the documents necessary to substantiate it, upon the application for final payment.

13.7.1.2 For claims of less than fifty thousand dollars ($50,000), the District shall respond in writing within forty-five (45) days of receipt of the Claim or may request in writing within thirty (30) days of receipt of the Claim any additional documentation supporting the claim or relating to defenses or claims the District may have against the DBE.

13.7.1.2.1 If additional information is required, it shall be requested and provided by mutual agreement of the parties.

13.7.1.2.2 District's written response to the documented Claim shall be submitted to the DBE within fifteen (15) days after receipt of the further documentation or within a period of time no greater than that taken by the DBE to produce the additional information, whichever is greater.

13.7.1.3 For claims of over fifty thousand dollars ($50,000) and less than or equal to three hundred seventy-five thousand dollars ($375,000), the District shall respond in writing to all written Claims within sixty (60) days of receipt of the claim, or may request, in writing, within thirty (30) days of receipt of the Claim any additional documentation supporting the Claim or relating to defenses or claims the District may have against the DBE.

13.7.1.3.1 If additional information is required, it shall be requested and provided upon mutual agreement of the District and the DBE.

13.7.1.3.2 The District's written response to the claim, as further documented, shall be submitted to the DBE within thirty (30) days after receipt of the further documentation, or within a period of time no greater than that taken by the DBE to produce the additional information or requested documentation, whichever is greater.

13.7.1.4 If DBE disputes the District’s written response, or the District fails to respond within the time prescribed, DBE may so notify the District, in writing, either within fifteen (15) days of receipt of the District's response or within fifteen (15) days of the District's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the District shall schedule a meet and confer conference within thirty (30) days for settlement of the dispute.

13.7.1.5 Following the meet and confer conference, if the claim or any portion of it remains in dispute, the DBE shall file a claim as

provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions the running of the time within which a claim must be filed shall be tolled from the time the DBE submits its written Claim until the time the Claim is denied, including any period of time utilized by the meet and confer process.

13.7.1.6 For any civil action filed to resolve claims filed pursuant to this section, within sixty (60) days, but no earlier than thirty (30) days, following the filing of responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within fifteen (15) days by both parties of a disinterested third person as mediator, shall be commenced within thirty (30) days of the submittal, and shall be concluded within fifteen (15) days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of both parties. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.

13.7.1.7 If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of the Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act, (commencing with Section 2016) of Chapter 1 of Title 4 of part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.

13.7.1.8 The District shall not fail to pay money as to any portion of a Claim which is undisputed except as otherwise provided in the Contract Documents. In any suit filed pursuant to this section, the District shall pay interest at the legal rate on any arbitration award or judgment. Interest shall begin to accrue on the date the suit is filed in a court of law.

13.7.2 DBE shall bind its Subcontractors to the provisions of this Section and will hold the District harmless against disputes by Subcontractors.

13.8 Claims Procedure Compliance

13.8.1 Failure to submit and administer claims as required in Article 13 shall waive DBE's right to claim on any specific issues not included in a timely submitted claim. Claim(s) not raised in a timely protest and timely claim submitted under this Article 13 may not be asserted in any subsequent litigation, Government Code Claim, or legal action.

13.8.2 District shall not be deemed to waive any provision under this Article 13, if at Owner's sole discretion, a claim is administered in a manner not in accord with this Article 13. Waivers or modifications of this Article 13 may only be made by a signed change order approved as to form by legal counsel for both District and DBE; oral or implied modifications shall be ineffective.

13.9 Claim Resolution Non-Applicability

13.9.1 The procedures for dispute and claim resolution set forth in this Article shall not apply to the following:

13.9.1.1 Personal injury, wrongful death or property damage claims.

13.9.1.2 Latent defect or breach of warranty or guarantee to repair.

13.9.1.3 Stop payment notices.

13.9.1.4 District's rights set forth in the Article on Suspension and Termination.

13.9.1.5 Disputes arising out of labor compliance enforcement by the Department of Industrial Relations; or

13.9.1.6 District rights and obligations as a public entity set forth in applicable statutes; provided, however, that penalties imposed against a public entity by statutes, including, but not limited to, Public Contract Code sections 20104.50 and 7107, shall be subject to the Claim Resolution requirements provided in this Article.

13.10 Attorney's Fees

Should litigation be necessary to enforce any terms or provisions of this Agreement, then each party shall bear its own litigation and collection expenses, witness fees, court costs and attorney's fees.

14. PROTECTION OF PERSONS AND PROPERTY

14.1 Safety of Persons and Property

14.1.1 The DBE shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Work. The District shall have no responsibility for initiating, maintaining and supervising safety of persons and property.

14.1.2 The DBE shall furnish to the District a copy of the DBE's safety plan, specifically adapted for the Project, within the time frame indicated in the Contract Documents and specifically adapted for the Project. However, implementation and maintenance of the safety plan shall be the sole responsibility of the DBE.

14.1.3 The DBE shall take precautions for safety and provide protection to prevent damage, injury or loss to:

14.1.3.1 Workers working under the Agreement and other persons who may be affected by it;

14.1.3.2 The Work and materials and equipment to be incorporated in it, whether in storage on or off the Project site, under care, custody

or control of the DBE or the DBE's Subcontractors or sub-subcontractors; and

14.1.3.3 Other property at the Project site, or adjacent to it, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement during the course of construction.

14.1.4 The DBE shall comply with all 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.

14.1.5 The DBE shall erect and maintain, as required by existing conditions and performance of the Contract Documents, safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying the District, other owners (other than the District) and users of adjacent sites and utilities.

14.1.6 The DBE shall comply with all applicable laws, ordinances, rules, regulations and lawful orders of public authorities regarding the storage and/or use of explosives or other hazardous materials or equipment necessary for execution of the Work. The DBE shall employ properly qualified personnel for supervision of same.

14.1.7 The DBE shall remedy damage and loss to property caused in whole or in part by the DBE, a Subcontractor, a sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the DBE is responsible. The foregoing obligations of the DBE are in addition to the DBE's indemnity and defense obligations.

14.1.8 When conditions of the Work, in the judgment of the District, present unreasonable risk of injury or death to persons or property damage, the District, may direct the DBE, at the DBE's sole expense, to close down the Work and not commence work again until all dangerous conditions are eliminated.

14.1.9 The DBE, at the DBE's own cost, shall rebuild, repair, restore and make good any and all damages to any portion of the Work affected by such causes before its acceptance.

14.1.10 DBE shall take all precautions to protect the Work, and all equipment, materials, and supplies related to the Work protected from trespassers, vandals, and protestors, including but not limited to hiring security personnel to guard and patrol the Project site throughout the duration of the Project's schedule until Completion is accomplished. DBE shall bear the costs of such security.

14.2 Emergencies

In an emergency affecting safety of persons or property, the DBE shall act, at the DBE's sole discretion, to prevent any threatened damage, injury or loss. Additional compensation or extension of Contract Time claimed by the DBE because of an emergency will be reviewed as provided in Article 9, Changes in

the Work. The DBE shall maintain emergency vehicle access to the site at all times during the course of the project up to and including Final Acceptance of the work.

15. INSURANCE, BONDS, AND INDEMNIFICATION

15.1 Insurance

The DBE shall comply with the insurance requirements as indicated below.

15.1.1 Professional Liability Insurance

DBE shall procure and maintain Professional Liability Insurance on a Claims Made basis at the required limits subject to no more than Twenty-Five Thousand Dollars ($25,000) per claim deductible, coverage to continue through completion of construction plus two (2) years thereafter.

15.1.2 Commercial General Liability and Automobile Liability Insurance

15.1.2.1 DBE shall procure and maintain, during the life of the Project, Commercial General Liability Insurance and Automobile Liability Insurance that shall protect DBE, District, its Board Members, employees, agents, Construction Manager(s), Project Manager(s), Project Inspector(s), and Criteria Architect(s) from all claims for bodily injury, property damage, personal injury, death, advertising injury, and medical payments arising from operations under the Project. This coverage shall be provided in a form at least as broad as Insurance Services (ISO) Form CG 00 01 11 88. DBE shall ensure that Products Liability and Completed Operations coverage, Fire Damage Liability, and Any auto including owned, non-owned, and hired, are included within the above policies and at the required limits, or DBE shall procure and maintain these coverages separately.

15.1.2.2 DBE's deductible or self-insured retention for its Commercial General Liability Insurance policy shall not exceed five thousand dollars ($5,000) for deductible or twenty-five thousand dollars ($25,000) for self-insured retention, respectively, unless approved in writing by District.

15.1.2.3 All such policies shall be written on an occurrence form.

15.1.3 Excess Liability Insurance

15.1.3.1 If DBE's underlying policy limits are less than required, subject to the District's sole discretion, DBE may procure and maintain, during the life of the Project, an Excess Liability Insurance Policy to meet the policy limit requirements of the required policies in order to satisfy, in the aggregate with its underlying policy, the insurance requirements herein.

15.1.3.2 There shall be no gap between the per occurrence amount of any underlying policy and the start of the coverage under the

Excess Liability Insurance Policy. Any Excess Liability Insurance Policy shall protect DBE, District, its Board Members, employees, agents, Construction Manager(s), Project Manager(s), Project Inspector(s), and Criteria Architect(s) in the amounts and in compliance with all requirements for Commercial General Liability and Automobile Liability and Employers' Liability Insurance.

15.1.3.3 The District, in its sole discretion, may accept the Excess Liability Insurance Policy that bring DBE's primary limits to the minimum requirements herein.

15.1.4 Subcontractor

15.1.4.1 DBE shall require its Subcontractor(s), if any, to procure and maintain Commercial General Liability Insurance, Automobile Liability Insurance, and Excess Liability Insurance (if Subcontractor elects to satisfy, in part, the insurance required herein by procuring and maintaining an Excess Liability Insurance Policy) with minimum limits at least equal to the amount required of the DBE except where smaller minimum limits are permitted as set forth below.

15.1.5 Workers' Compensation and Employers' Liability Insurance

15.1.5.1 In accordance with provisions of section 3700 of the California Labor Code, the DBE and every Subcontractor shall be required to secure the payment of compensation to its employees.

15.1.5.2 DBE shall procure and maintain, during the life of the Project, Workers' Compensation Insurance and Employers' Liability Insurance for all of its employees engaged in work under the Project, on/or at the Site of the Project. This coverage shall cover, at a minimum, medical and surgical treatment, disability benefits, rehabilitation therapy, and survivors' death benefits. DBE shall require its Subcontractor(s), if any, to procure and maintain Workers' Compensation Insurance and Employers' Liability Insurance for all employees of Subcontractor(s). Any class of employee or employees not covered by a Subcontractor's insurance shall be covered by DBE's insurance. If any class of employee or employees engaged in Work on the Project, on or at the Site of the Project, is not protected under the Workers' Compensation Insurance, DBE shall provide, or shall cause a Subcontractor to provide, adequate insurance coverage for the protection of any employee(s) not otherwise protected before any of those employee(s) commence work.

15.1.6 Builder's Risk Insurance: Builder's Risk "All Risk" Insurance

15.1.6.1 DBE shall procure and maintain, during the life of this Contract, Builder's Risk (Course of Construction), or similar first party property coverage acceptable to the District, issued on a replacement cost value basis. The cost shall be consistent with the total replacement cost of all insurable Work of the Project included within the Contract Documents. Coverage is to insure against all risks of accidental physical loss and shall include without limitation the perils of

vandalism and/or malicious mischief (both without any limitation regarding vacancy or occupancy), sprinkler leakage, civil authority, theft, sonic disturbance, earthquake, flood, collapse, wind, rain, dust, fire, war, terrorism, lightning, smoke, and rioting. Coverage shall include debris removal, demolition, increased costs due to enforcement of all applicable ordinances and/or laws in the repair and replacement of damaged and undamaged portions of the property, and reasonable costs for the Criteria Architect's and engineering services and expenses required as a result of any insured loss upon the Work and Project, including completed Work and Work in progress, to the full insurable value thereof.

15.1.7 Pollution Liability Insurance

15.1.7.1 DBE shall procure and maintain Pollution Liability Insurance that shall protect DBE, District, Construction Manager(s), Project Inspector(s), and Criteria Architect(s) from all claims for bodily injury, property damage, including natural resource damage, cleanup costs, removal, storage, disposal, and/or use of the pollutant arising from operations under this Agreement, and defense, including costs and expenses incurred in the investigation, defense, or settlement of claims. Coverage shall apply to sudden and/or gradual pollution conditions resulting from the escape or release of smoke, vapors, fumes, acids, alkalis, toxic chemicals, liquids, or gases, natural gas, waste materials, or other irritants, contaminants, or pollutants, including asbestos. This coverage shall be provided in a form at least as broad as Insurance Services Offices, Inc. (ISO) Form CG 2415, or DBE shall procure and maintain these coverages separately.

15.1.7.2 DBE shall warrant that any retroactive date applicable to coverage under the policy predates the Effective Date of this Agreement and that continuous coverage will be maintained or an extended reporting or discovery period will be exercised for a period of three (3) years, beginning from the time that the Work under the Contract is completed.

15.1.7.3 If DBE is responsible for removing any pollutants from a site, then DBE shall ensure that Any Auto, including owned, non-owned, and hired, are included within the above policies and at the required limits, to cover its automobile exposure for transporting the pollutants from the site to an approved disposal site. This coverage shall include the Motor Carrier Act Endorsement, MCS 90.

15.1.8 Proof of Carriage of Insurance and Other Requirements Endorsements and Certificates

15.1.8.1 DBE shall not commence Work nor shall it allow any Subcontractor to commence Work on the Project, until DBE and its Subcontractor(s) have procured all required insurance and DBE has delivered in duplicate to the District complete endorsements (or entire insurance policies) and certificates indicating the required coverages have been obtained, and the District has approved these documents.

15.1.8.2 Endorsements, certificates, and insurance policies shall include the following:

15.1.8.2.1 A clause stating the following, or other language acceptable to the District:

"This policy shall not be canceled until written notice to District, Criteria Architect, and Construction Manager stating date of the cancellation by the insurance carrier. Date of cancellation may not be less than thirty (30) days after date of mailing notice."

15.1.8.2.2 Language stating in particular those insured, extent of insurance, location and operation to which insurance applies, expiration date, to whom cancellation and reduction notice will be sent, and length of notice period.

15.1.8.3 All endorsements, certificates and insurance policies shall state that District, its Board Members, employees and agents, Construction Manager(s), Project Manager(s), Inspector(s) and Criteria Architect(s) are named additional insureds under all policies except Workers' Compensation Insurance, Employers' Liability Insurance, and Professional Liability Insurance.

15.1.8.4 No policy shall be amended, canceled, or modified, and the coverage amounts shall not be reduced, until DBE or DBE's broker has provided written notice to District, Criteria Architect, and Construction Manager stating date of the amendment, modification, cancellation or reduction, and a description of the change. Date of amendment, modification, cancellation or reduction may not be less than thirty (30) days after date of mailing notice.

15.1.8.5 Insurance written on a "claims made" basis shall be retroactive to a date that coincides with or precedes DBE's commencement of Work, including subsequent policies purchased as renewals or replacements. Said policy is to be renewed by the DBE and all Subcontractors for a period of five (5) years following completion of the Work or termination of this Agreement. Such insurance must have the same coverage and limits as the policy that was in effect during the term of this Agreement, and will cover the DBE and all Subcontractors for all claims made.

15.1.8.6 DBE's and Subcontractors' insurance policy(s) shall be primary and non-contributory to any insurance or self-insurance maintained by District, its Board Members, employees and/or agents, the State of California, Construction Manager(s), Project Manager(s), Inspector(s), and/or Criteria Architect(s).

15.1.8.7 DBE's insurance limit shall apply separately to each insured against whom a claim is made or suit is brought.

15.1.8.8 All endorsements shall waive any right to subrogation against any of the named additional insureds.

15.1.8.9 All policies shall be written on an occurrence form.

15.1.8.10 All of DBE's insurance shall be with insurance companies with an A.M. Best rating of no less than A: XI.

15.1.8.11 The insurance requirements set forth herein shall in no way limit the DBE's liability arising out of or relating to the performance of the Work or related activities.

15.1.8.12 Failure of DBE and/or its Subcontractor(s) to comply with the insurance requirements herein shall be deemed a material breach of the Agreement and constitute a Default by the DBE pursuant to this Agreement.

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15.1.9 Insurance Policy Limits

The limits of insurance shall not be less than the amounts set forth below. If DBE normally carries insurance in an amount greater than the minimum amounts required by District, that greater amount shall become the minimum required amount of insurance for purposes of the Contract. Therefore, DBE hereby acknowledges and agrees that all insurance carried by it shall be deemed liability coverage for all actions it performs in connection with the Contract.

Professional Liability		$5M
Commercial General Liability	Product Liability and Completed Operations, Fire Damage Liability – Split Limit	$2M per occurrence; $4M aggregate
Automobile Liability – Any Auto	Combined Single Limit	$2M
Workers' Compensation		$1M (Statutory limits under State law)
Employer's Liability		$5M
Builder's Risk		Replacement Cost
Pollution Liability		$1M per claim; $2M aggregate

The limits of insurance for those Subcontractors whose scope of work does not exceed Two Million Dollars ($2,000,000) shall not be less than the following amounts:

Commercial General Liability	Product Liability and Completed Operations, Fire Damage Liability – Split Limit	$2,000,000 per occurrence; $4,000,000 aggregate
Automobile Liability – Any Auto	Combined Single Limit	$1,000,000
Workers' Compensation		Statutory limits under State law
Employer's Liability		$1,000,000

Notwithstanding anything in this Agreement to the contrary, the above insurance requirements may be modified as appropriate for Subcontractors, with District's prior written approval.

15.2 Indemnification

15.2.1 To the fullest extent permitted by California law, DBE shall indemnify, keep and hold harmless the District and its respective Board Members, officers, representatives, employees, consultants, the Criteria Architect, and Construction Manager in both individual and official capacities and their consultants ("Indemnitees"), from any and all claims, demands, causes of action, costs, expenses, liability, loss, damage or injury of any kind, in law or equity, including, without limitation, any suit, claim, damage, loss, or expense attributable to, without limitation, bodily injury, sickness, disease, death, alleged patent violation or copyright infringement, or injury to or destruction of tangible property (including damage to the Work itself), and including but not limited to attorney's fees and costs, ("Claim") as follows:

15.2.1.1 For design professional services: Any Claim caused by, arising out of, resulting from, or incidental to the negligence, recklessness, or willful misconduct of the DBE, its officers, employees, Subcontractors, consultants, or agents, in connection with any design professional services under or related to this Agreement.

15.2.1.2 For all other Work: Any Claim caused by, arising out of, resulting from, or incidental to performance of the Work under this Contract, other than design professional services, by the DBE or its Subcontractors, vendors and/or suppliers, except to the extent caused wholly by the active negligence or willful misconduct of the Indemnitees, as found by a court or arbitrator of competent jurisdiction, in which case the DBE's indemnification and hold harmless obligation shall be reduced by the proportion of the Indemnitees' liability.

15.2.2 This indemnification and hold harmless obligation includes, but is not limited to, any failure or alleged failure by DBE to comply with any law and/or provision of the Contract Documents, including, without limitation, any stop payment notice actions or liens, including Civil Wage and Penalty Assessments and/or Orders by the California Department of Industrial Relations.

15.2.3 DBE shall also defend, at its own expense, Indemnitees against any and all Claims(s) caused by, arising out of, resulting from, or incidental to, the performance of the Work, including design professional services, under this Contract by DBE, its Subcontractors, vendors, or suppliers, except to the extent caused by the sole negligence, active negligence, or willful misconduct of the Indemnitees, as found by a court or arbitrator of competent jurisdiction, in which case the DBE's defense obligation shall be reduced by the proportion of the Indemnitees' liability. The District shall have the right to accept or reject any legal representation that DBE proposes to defend the Indemnitees. If the Indemnitees provide their own defense due to failure to timely respond to tender of defense, rejection of tender of defense, or conflict of interest of proposed counsel, DBE shall reimburse Indemnitees for any expenditures, including reasonable attorney's fees and costs. This defense obligation includes, but is not limited to, any failure or alleged failure by DBE to comply with any provision of law, any failure or alleged failure to timely and properly fulfill all of its obligations under the Contract Documents in strict

accordance with their terms, and without limitation, any failure or alleged failure of DBE's obligations regarding any stop payment notice actions or liens, including Civil Wage and Penalty Assessments and/or Orders by the California Department of Industrial Relations. This agreement and obligation of the DBE shall not be construed to negate, abridge, or otherwise reduce any right or obligation of defense that would otherwise exist as to any party or person described herein.

15.2.4 The DBE shall give prompt notice to the District in the event of any injury (including death), loss, or damage included herein. Without limitation of the provisions herein, if the DBE's agreement to indemnify and hold harmless the Indemnitees or its agreement to defend Indemnitees as provided herein against liability for damage arising out of bodily injury to persons or damage to property caused by or resulting from the negligence of any of the Indemnitees shall to any extent be or be determined to be void or unenforceable, it is the intention of the parties that these circumstances shall not otherwise affect the validity or enforceability of the DBE's agreement to indemnify, defend, and hold harmless the rest of the Indemnitees, as provided herein, and in the case of any such suits, claims, damages, losses, or expenses caused in part by the default, negligence, or act or omission of the DBE, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, and in part by any of the Indemnitees, the DBE shall be and remain fully liable on its agreements and obligations herein to the fullest extent per-mitted by law.

15.2.5 In any and all claims against any of the Indemnitees by any employee of the DBE, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the DBE's indemnification obligation herein shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the DBE or any Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

15.2.6 The District may retain so much of the moneys due to the DBE as shall be considered necessary, until disposition of any such suit, claims or actions for damages or until the District, Criteria Architect and Construction Manager have received written agreement from the DBE that DBE will unconditionally defend the District and its respective Board Members, officers, representatives, employees, consultants, the Criteria Architect and Construction Manager and their subconsultants and pay any damages due by reason of settlement or judgment.

15.2.7 The indemnification and defense obligations hereunder shall survive the completion of Work, including the warranty/guarantee period, and/or the termination of the Contract.

15.3 No Personal Liability

No officer, elective and appointive official, employee, or consultant of the District will be personally responsible for liabilities arising under this Agreement.

15.4 Performance Bond and Payment Bonds

15.4.1 The DBE shall furnish to the District, prior to the execution of any contract: (1) a bond in an amount at least equal to one hundred percent (100%) of the Stipulated as security for faithful performance of the Contract Documents; and (2) a bond in an amount at least equal to one hundred percent (100%) of GMP as security for payment of persons performing labor and/or furnishing materials in connection with this Contract. All bonds related to this Project shall be in the forms set forth in these Contract Documents and shall comply with all requirements of the Contract Documents, including, without limitation, the bond forms. The bonds shall be issued by a California admitted surety with a rating classification of "A XIII" or better according to Best's Rating Service. Cost of bonds shall be included in the GMP.

15.4.2 The District acknowledges that any faithful performance and payments bonds provided by the DBE shall not apply to errors or omissions in the furnishing of professional services in connection with architecture or engineering services provided by the DBE or its consultants. The District waives and releases all claims against such sureties arising out of or relating to such professional errors and omissions; such release, however, does not apply to a failure to provide professional services where required under the Contract Documents and the performance bonds shall include the costs of such services. Professional Liability insurance shall be primary insurance in settling claims related to Errors and Omissions.

16. SEPARATE CONTRACTS

16.1 District's Right to Perform Construction and to Award Separate Contracts

16.1.1 The District reserves the right to perform work or operations related to the Project with the District's own work force, and to award separate contracts in connection with other portions of work or other construction or operations on the Project site.

16.1.2 When separate contracts are awarded for different portions of work or for other construction or operations on the Project site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate agreement.

16.1.3 The District will provide for coordination of the activities of the District's own work force and of each separate Contractor with the Work of the DBE, who shall cooperate with them. The DBE shall participate with other separate Contractors and the District in reviewing and revising their Baseline Schedules when directed by the District. The resulting Baseline Schedules shall then constitute the schedules to be used by the DBE, separate Contractors and the District.

16.1.4 The District reserves the right to perform other work in connection with the Project or adjacent to the Project site by separate contract or otherwise. The DBE shall at all times conduct the Work so as to impose no hardship on the District or others engaged in separate work on the Project site, nor to cause any unreasonable delay or hindrance to the separate work.

16.2 Mutual Responsibility

16.2.1 The DBE shall afford the District and other Contractors the opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractors construction and operations with theirs as required by the Contract Documents.

16.2.2 If part of the DBE's work relies on proper execution or results upon construction or operations by the District or separate Contractors, the DBE shall, prior to proceeding with that portion of the work, report to the District apparent discrepancies or defects in other construction that would render it unsuitable for proper execution and results. Failure of the DBE to report any discrepancies or defects shall constitute an acknowledgment that the District's or separate Contractors' complete or partially completed construction is fit and proper to receive the DBE's work.

16.2.3 The DBE shall promptly remedy damage wrongfully caused by the DBE to any completed or partially completed construction or to any property of the District or separate Contractors.

17. MISCELLANEOUS

17.1 Governing Law

This Agreement shall be governed by the laws of the State of California. The venue for any action or proceeding, in law or equity, which may be brought in connection with this Agreement is the county in which the District administration office is located.

17.2 Successors

The District and the DBE respectively bind themselves, their partners, shareholders, successors, assigns and legal representatives to the other party and to shareholders, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. Neither party shall assign the Agreement as a whole without the written consent of the other party. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all of its obligations under the Agreement and the Contract Documents.

17.3 Notice

Written notices or other communications required or permitted hereunder shall be sufficiently given if delivered personally, by electronic mail including delivery receipt, by facsimile, by registered or certified first class U.S. mail, return receipt requested with postage pre-paid, or by commercial courier. Written notice shall be deemed to have been duly served on the date of delivery if delivered in person, by electronic mail, or by facsimile, on the first working day after deposit if delivery by overnight courier, or two (2) working days after deposit of delivery by placing in the U.S. mail as provided herein. All notices shall be addressed to the appropriate authorized representative, as follows:

District:	DBE:
Kristoffer Bridges Solano Community College District 4000 Suisun Valley Road Fairfield, CA 94534 Email: Kristoffer.Bridges@solano.edu	[NAME] [ADDRESS] [FAX] [EMAIL]
With a mandatory copy to:	With a mandatory copy to:
Deidree Y.M.K. Sakai Dannis Woliver Kelley 200 California Street Suite 400 San Francisco, CA 94111 Email: dsakai@dwkesq.com	[NAME] [ADDRESS] [FAX] [EMAIL]

17.4 Modifications

No modifications or Change Orders shall be valid unless in writing and signed by the District and the DBE or their respective permitted successors and assigns.

17.5 No Oral Agreements

No oral agreement or conversation with any officer, agent, or employee of District, either before or after execution of Contract Documents, shall affect or modify any of the terms or obligations contained in any of the documents comprising the Contract Documents.

17.6 Meaning of Words

Any and all headings used in this Agreement are for convenience only and do not modify, define or limit the provisions of it. Words of any gender shall be deemed and construed to include correlative words of the other gender. Words importing the singular number shall include all supplements and/or amendments to any such exhibits, appendixes or documents entered into in accordance with the terms of this Agreement. All references to any person or entity shall be deemed to include any person or entity succeeding to the rights, duties and obligations of such person or entity in accordance with the terms of this Agreement. Where reference is made in this Agreement or to another Contract Document, the reference refers to that provision as amended or supplemented by the other provisions of the Contract Documents. No provision of this Agreement shall be interpreted for or against a party because that party or its legal representative drafted such provision, and this Agreement shall be construed as if jointly prepared by the parties.

17.7 Severability

If any provision of this Agreement is held to be inoperative or unenforceable as applied in any particular case because it conflicts with any other provision hereof or any constitution, statute, ordinance, rule of law or public policy, or for any other reason, such holding shall not have the effect of rendering any

other provision contained herein to be inoperative or unenforceable to any extent whatsoever. The invalidity of any one or more phrases, sentences, clauses or sections contained in this Agreement shall not affect the remaining portions of this Agreement, or any part of it, and the remaining portions shall otherwise remain in full force and effect.

17.8 Whole Agreement

This Agreement and any and all exhibits, appendixes, and the Contract Documents shall constitute the entire agreement between the Parties, and no inducements, considerations, promises or other references shall be implied in this Agreement that are not expressly addressed in this Agreement.

17.9 Record Retention and Audits

17.9.1 DBE agrees that the District, or its designated representative, shall have the right to review and to copy any records and supporting documentation pertaining to the performance of this Agreement. The DBE shall keep full and detailed accounts and exercise such controls as may be necessary for proper financial management under this Agreement; the accounting and control systems shall be reasonably satisfactory to the District and shall be in accordance with generally accepted accounting standards.

17.9.2 DBE shall retain all records, books, correspondence, instructions, drawings, receipts, subcontracts, vouchers, memoranda and other data relating to this Agreement for a period of five (5) years after Final Payment under this Agreement, or for such longer period as may be required by law. DBE agrees to allow the District to audit this Agreement, including all financial and performance records, and to allow access to all records to District's auditor(s) during normal business hours and to allow interviews of any employees who might reasonably have information related to such records, and not withhold relevant information. Further, DBE agrees to include a similar right of the District to audit records and interview staff in any subcontract related to performance of this Agreement.

17.10 Deliverables

The DBE is responsible for delivery to the District certain drawings, schedules, reports, samples and other documents as described in the Contract Documents.

17.11 Waiver

The failure of District in any one or more instances to insist upon strict performance of any of the terms of the Contract Documents or to exercise any option herein conferred shall not be construed as a waiver or relinquishment to any extent of the right to assert or rely upon any such terms or option on any future occasion. No action or failure to act by the District, Criteria Architect, or Construction Manager shall constitute a waiver of any right or duty afforded the District under the Contract Documents, nor shall any action or failure to act constitute an approval of or acquiescence on any breach thereunder, except as may be specifically agreed in writing.

17.12 Computer Software

DBE certifies that it has appropriate systems and controls in place to ensure that District funds will not be used in the performance of this contract for the acquisition, operation or maintenance of computer software in violation of copyright laws.

[SIGNATURES ON FOLLOWING PAGE]

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their respective officers who are duly authorized, as of the Effective Date.

ACCEPTED AND AGREED:

Dated: _____, 2022

Solano Community College District

By: _____

Name: _____

Title: _____

Dated: _____, 2022

[DBE]

By:_____

Name: _____

Title: _____

Information regarding Design/Build Entity:

Design Professional License No.: _____

Contractor License No.: _____

DIR Registration No.: _____

Address: _____

Telephone: _____

Facsimile: _____

E-Mail: _____

Type of Business Entity:
_____ Individual
_____ Sole Proprietorship
_____ Partnership
_____ Limited Partnership
_____ Corporation, State: _____
_____ Limited Liability Company
_____ Other: _____

_____:
Employer Identification and/or
Social Security Number

NOTE: Section 6041 of the Internal Revenue Code (26 U.S.C. 6041) and Section 1.6041-1 of Title 26 of the Code of Federal Regulations (26 C.F.R. 1.6041-1) requires the recipients of $600.00 or more to furnish their taxpayer information to the payer. In order to comply with these requirements, the District requires the Contractor to furnish the information requested in this section.

CONTRACT DOCUMENTS

For the following design-build project:

Substation #3 & #4 Replacement Project
Fairfield Campus
4000 Suisun Valley Road
Fairfield, CA 94534

By and between

Solano Community College District
4000 Suisun Valley Road
Fairfield, CA 94534

And

[Name of DBE]
[Address]

Dated as of _____, 2022

PAYMENT BOND
DBE's Labor & Material Bond
(100% of Contract Price)

KNOW ALL PERSONS BY THESE PRESENTS:

WHEREAS, the governing board ("Board") of the Solano Community College District ("District") and [NAME OF DBE] ("Principal") have entered into a contract for the furnishing of all materials and labor, services and transportation, necessary, convenient, and proper to perform the following project:

Substation #3 & #4 Project

("Project" or "Contract") which Contract dated _____, 2022, and all of the Contract Documents attached to or forming a part of the Contract, are hereby referred to and made a part hereof; and

WHEREAS, pursuant to law and the Contract, the Principal is required, before entering upon the performance of the work, to file a good and sufficient bond with the body by which the Contract is awarded in an amount equal to one hundred percent (100%) of the Contract price, to secure the claims to which reference is made in sections 9000 through 9510 and 9550 through 9566 of the Civil Code, and division 2, part 7, of the Labor Code.

NOW, THEREFORE, the Principal and _____ _____ ("Surety") are held and firmly bound unto all laborers, material men, and other persons referred to in said statutes in the sum of _____ Dollars ($_____), lawful money of the United States, being a sum not less than the total amount payable by the terms of Contract, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, or assigns, jointly and severally, by these presents.

The condition of this obligation is that if the Principal or any of its subcontractors, or their heirs, executors, administrators, successors, or assigns of any, all, or either of them shall fail to pay for any labor, 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 required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the Principal or any of his or its subcontractors of any tier under Section 13020 of the Unemployment Insurance Code with respect to such work or labor, that the Surety will pay the same in an amount not exceeding the amount herein above set forth, and also in case suit is brought upon this bond, will pay a reasonable attorney's fee to be awarded and fixed by the court, and to be taxed as costs and to be included in the judgment therein rendered.

It is hereby expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies, and corporations entitled to file claims under section 9100 of the Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond.

Should the condition of this bond be fully performed, then this obligation shall become null and void; otherwise it shall be and remain in full force and affect.

And the Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of Contract or the specifications accompanying the same shall in any manner affect its obligations on this bond, and it does hereby waive notice of any such change, extension, alteration, or addition.

IN WITNESS WHEREOF, two (2) identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety above named, on the _____ day of _____, 20___.

Principal	Surety
By	By
	Name of California Agent of Surety
	Address of California Agent of Surety
	Telephone No. of California Agent of Surety

DBE must attach a Notarial Acknowledgment for all Surety's signatures and a Power of Attorney and Certificate of Authority for Surety. The California Department of Insurance must authorize the Surety to be an admitted surety insurer.

END OF DOCUMENT

PERFORMANCE BOND
(100% of Contract Price)

KNOW ALL PERSONS BY THESE PRESENTS:

WHEREAS, the governing board ("Board") of the Solano Community College District ("District") and [DBE] ("Principal") have entered into a contract for the furnishing of all materials and labor, services and transportation, necessary, convenient, and proper to perform the following project:

Substation #3 & #4 Project

("Project" or "Contract") which Contract dated _____, 2022, and all of the Contract Documents attached to or forming a part of the Contract, are hereby referred to and made a part hereof; and

WHEREAS, said Principal is required under the terms of the Contract to furnish a bond for the faithful performance of the Contract.

NOW, THEREFORE, the Principal and _____ _____ ("Surety") are held and firmly bound unto the Board of the District in the penal sum of

_____

Dollars ($_____), lawful money of the United States, for the payment of which sum well and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents, to:

- Promptly perform all the work required to complete the Project; and
- Pay to the District all damages the District incurs as a result of the Principal's failure to perform all the Work required to complete the Project.

Or, at the District's sole discretion and election, the Surety shall obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by the District of the lowest responsible bidder, arrange for a contract between such bidder and the District and make available as Work progresses sufficient funds to pay the cost of completion less the "balance of the Contract Price," and to pay and perform all obligations of Principals 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 District under the Contract and any modifications thereto, less the amount previously paid by the District to the Principal, less any withholdings by the District allowed under the Contract. District shall not be required or obligated to accept a tender of a completion contractor from the Surety for any or no reason.

The condition of the obligation is such that, if the above bound Principal, its 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 the Contract and any alteration thereof made as therein provided, on its part to be kept and performed at the time and in the intent and meaning, including all contractual guarantees and warrantees of materials and workmanship, and shall indemnify and save harmless the District, its trustees, officers and agents, as therein

stipulated, then this obligation shall become null and void, otherwise it shall be and remain in full force and virtue.

Surety expressly agrees that the District may reject any contractor or subcontractor proposed by Surety to fulfill its obligations in the event of default by the Principal. Surety shall not utilize Principal in completing the Work nor shall Surety accept a Bid from Principal for completion of the Work if the District declares the Principal to be in default and notifies Surety of the District's objection to Principal's further participation in the completion of the Work.

As a condition precedent to the satisfactory completion of the Contract, the above obligation shall hold good for a period equal to the warranty and/or guarantee period of the Contract, during which time Surety's obligation shall continue if DBE shall fail to make full, complete, and satisfactory repair and replacements and totally protect the District from loss or damage resulting from or caused by defective materials or faulty workmanship. The obligations of Surety hereunder shall continue so long as any obligation of DBE remains. Nothing herein shall limit the District's rights or the DBE or Surety's obligations under the Contract, law or equity, including, but not limited to, California Code of Civil Procedure section 337.15.

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

IN WITNESS WHEREOF, two (2) identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety above named, on the _____ day of _____, 20___.

Principal	Surety
By	By
	Name of California Agent of Surety
	Address of California Agent of Surety
	Telephone No. of California Agent of Surety

DBE must attach a Notarial Acknowledgment for all Surety's signatures and a Power of Attorney and Certificate of Authority for Surety. The California Department of Insurance must authorize the Surety to be an admitted surety insurer.

END OF DOCUMENT

REGISTERED SUBCONTRACTORS LIST
(Labor Code Section 1771.1)

PROJECT: **Substation #3 & #4 Project**

Date Submitted (for Updates): _____

DBE acknowledges and agrees that it must clearly set forth below the name and Department of Industrial Relations (DIR) registration number of each subcontractor **for all tiers** who will perform work or labor or render service to DBE or its subcontractors in or about the construction of the Work **at least two (2) weeks before the subcontractor is scheduled to perform work**. This document is to be updated as all tiers of subcontractors are identified.

DBE acknowledges and agrees that, if DBE fails to list as to any subcontractor of any tier who performs any portion of Work, the Contract is subject is subject to cancellation and the DBE will be subjected to penalty under applicable law.

If further space is required for the list of proposed subcontractors, attach additional copies of page 2 showing the required information, as indicated below.

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Date: _____

Name of DBE: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

HAZARDOUS MATERIALS
PROCEDURES & REQUIREMENTS

1. Summary

This document includes information applicable to hazardous materials and hazardous waste abatement.

2. Notice of Hazardous Waste or Materials

a. DBE shall give notice in writing to the District, the Construction Manager, and the Architect promptly, before any of the following materials are disturbed, and in no event later than twenty-four (24) hours after first observance, of any:

(1) Material that DBE believes may be a material that is hazardous waste or hazardous material, as defined in section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law;

(2) Other material that may present a substantial danger to persons or property exposed thereto in connection with Work at the site.

b. DBE's written notice shall indicate whether the hazardous waste or material was shown or indicated in the Contract Documents to be within the scope of Work, and whether the materials were brought to the site by DBE, its Subcontractors, suppliers, or anyone else for whom DBE is responsible. As used in this section the term "hazardous materials" shall include, without limitation, asbestos, lead, Polychlorinated biphenyl (PCB), petroleum and related hydrocarbons, and radioactive material.

c. In response to DBE's written notice, the District shall investigate the identified conditions.

d. If the District determines that conditions do not involve hazardous materials or that no change in terms of Contract is justified, the District shall so notify DBE in writing, stating reasons. If the District and DBE cannot agree on whether conditions justify an adjustment in Contract Price or Contract Time, or on the extent of any adjustment, DBE shall proceed with the Work as directed by the District.

e. If after receipt of notice from the District, DBE does not agree to resume Work based on a reasonable belief it is unsafe, or does not agree to resume Work under special conditions, then District may order such portion of Work that is in connection with such hazardous condition or such affected area to be deleted from the Work, or performed by others, or District may invoke its rights to terminate the Contract in whole or in part. District will determine entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Time as a result of deleting such portion of Work, or performing the Work by others.

f. If DBE stops Work in connection with any hazardous condition and in any area affected thereby, DBE shall immediately redeploy its workers, equipment, and materials, as necessary, to other portions of the Work to minimize delay and disruption.

3. **Additional Warranties and Representations**

a. DBE represents and warrants that it, its employees, and its subcontractors and their employees, shall at all times have the required levels of familiarity with the Site and the Work, training, and ability to comply fully with all applicable laws and contractual requirements for safe and expeditious performance of the Work, including whatever training is or may be required regarding the activities to be performed (including, but not limited to, all training required to address adequately the actual or potential dangers of Contract performance).

b. DBE represents and warrants that it, its employees, and its subcontractors and their employees, shall at all times have and maintain in good standing any and all certifications and licenses required by applicable federal, state, and other governmental and quasi-governmental requirements applicable to the Work.

c. DBE represents and warrants that it has studied carefully all requirements of the Specifications regarding procedures for demolition, hazardous waste abatement, or safety practices, specified in the Contract, and prior to submitting its bid, has either (a) verified to its satisfaction that the specified procedures are adequate and sufficient to achieve the results intended by the Contract Documents, or (b) by way of approved "or equal" request or request for clarification and written Addenda, secured changes to the specified procedures sufficient to achieve the results intended by the Contract Documents. DBE accepts the risk that any specified procedure will result in a completed Project in full compliance with the Contract Documents.

4. **Monitoring and Testing**

a. District reserves the right, in its sole discretion, to conduct air monitoring, earth monitoring, Work monitoring, and any other tests (in addition to testing required under the agreement or applicable law), to monitor Contract requirements of safe and statutorily compliant work methods and (where applicable) safe re-entry level air standards under state and federal law upon completion of the job, and compliance of the work with periodic and final inspection by public and quasi-public entities having jurisdiction.

b. DBE acknowledges that District has the right to perform, or cause to be performed, various activities and tests including, but not limited to, pre-abatement, during abatement, and post-abatement air monitoring, that District shall have no obligation to perform said activities and tests, and that a portion of said activities and tests may take place prior to the completion of the Work by DBE. In the event District elects to perform these activities and tests, DBE shall afford District ample access to the Site and all areas of the Work as may be necessary for the performance of these activities and tests.

DBE will include the potential impact of these activities or tests by District in the Contract Price and the Scheduled Completion Date.

c. Notwithstanding District's rights granted by this paragraph, DBE may retain its own industrial hygiene consultant at DBE's own expense and may collect samples and may perform tests including, but not limited to, pre-abatement, during abatement, and post-abatement personal air monitoring, and District reserves the right to request documentation of all such activities and tests performed by DBE relating to the Work and DBE shall immediately provide that documentation upon request.

5. **Compliance with Laws**

a. DBE shall perform safe, expeditious, and orderly work in accordance with the best practices and the highest standards in the hazardous waste abatement, removal, and disposal industry, the applicable law, and the Contract Documents, including, but not limited to, all responsibilities relating to the preparation and return of waste shipment records, all requirements of the law, delivering of all requisite notices, and obtaining all necessary governmental and quasi-governmental approvals.

b. DBE represents that it is familiar with and shall comply with all laws applicable to the Work or completed Work including, but not limited to, all federal, state, and local laws, statutes, standards, rules, regulations, and ordinances applicable to the Work relating to:

(1) The protection of the public health, welfare and environment;

(2) Storage, handling, or use of asbestos, PCB, lead, petroleum based products, radioactive material, or other hazardous materials;

(3) The generation, processing, treatment, storage, transport, disposal, destruction, or other management of asbestos, PCB, lead, petroleum, radioactive material, or hazardous waste materials or other waste materials of any kind; and

(4) The protection of environmentally sensitive areas such as wetlands and coastal areas.

6. **Disposal**

a. DBE has the sole responsibility for determining current waste storage, handling, transportation, and disposal regulations for the job Site and for each waste disposal facility. DBE must comply fully at its sole cost and expense with these regulations and any applicable law. District may, but is not obligated to, require submittals with this information for it to review consistent with the Contract Documents.

b. DBE shall develop and implement a system acceptable to District to track hazardous waste from the Site to disposal, including appropriate "Hazardous Waste Manifests" on the EPA form, so that District may track the volume of

waste it put in each landfill and receive from each landfill a certificate of receipt.

c. DBE shall provide District with the name and address of each waste disposal facility prior to any disposal, and District shall have the express right to reject any proposed disposal facility. DBE shall not use any disposal facility to which District has objected. DBE shall document actual disposal or destruction of waste at a designated facility by completing a disposal certificate or certificate of destruction forwarding the original to the District.

7. **Permits**

a. Before performing any of the Work, and at such other times as may be required by applicable law, DBE shall deliver all requisite notices and obtain the approval of all governmental and quasi-governmental authorities having jurisdiction over the Work. DBE shall submit evidence satisfactory to District that it and any disposal facility:

(1) have obtained all required permits, approvals, and the like in a timely manner both prior to commencement of the Work and thereafter as and when required by applicable law; and

(2) are in compliance with all such permits, approvals and the regulations.

For example, before commencing any work in connection with the Work involving asbestos-containing materials, or PCBs, or other hazardous materials subject to regulation, DBE agrees to provide the required notice of intent to renovate or demolish to the appropriate state or federal agency having jurisdiction, by certified mail, return receipt requested, or by some other method of transmittal for which a return receipt is obtained, and to send a copy of that notice to District. DBE shall not conduct any Work involving asbestos-containing materials or PCBs unless DBE has first confirmed that the appropriate agency having jurisdiction is in receipt of the required notification. All permits, licenses, and bonds that are required by governmental or quasi-governmental authorities, and all fees, deposits, tap fees, offsite easements, and asbestos and PCB disposal facilities expenses necessary for the prosecution of the Work, shall be procured and paid for by DBE. DBE shall give all notices and comply with the all applicable laws bearing on the conduct of the Work as drawn and specified. If DBE observes or reasonably should have observed that Plans and Specifications and other Contract Documents are at variance therewith, it shall be responsible for promptly notifying District in writing of such fact. If DBE performs any Work contrary to applicable laws, it shall bear all costs arising therefrom.

b. In the case of any permits or notices held in District's name or of necessity to be made in District's name, District shall cooperate with DBE in securing the permit or giving the notice, but the DBE shall prepare for District review and execution upon approval, all necessary applications, notices, and other materials.

8. **Indemnification**

To the fullest extent permitted by law, the indemnities and limitations of liability expressed throughout the Contract Documents apply with equal force and effect to any claims or liabilities imposed or existing by virtue of the removal, abatement, and disposal of hazardous waste. This includes, but is not limited to, liabilities connected to the selection and use of a waste disposal facility, a waste transporter, personal injury, property damage, loss of use of property, damage to the environment or natural resources, or "disposal" and "release" of materials associated with the Work (as defined in 42 U.S.C. § 960l *et seq*.).

9. **Termination**

District shall have an absolute right to terminate for default immediately without notice and without an opportunity to cure should DBE knowingly or recklessly commit a material breach of the terms of the Contract Documents, or any applicable law, on any matter involving the exposure of persons or property to hazardous waste. However, if the breach of contract exposing persons or property to hazardous waste is due solely to an ordinary, unintentional, and non-reckless failure to exercise reasonable care, then the procedures for termination for cause shall apply without modification.

END OF DOCUMENT

WORKERS' COMPENSATION CERTIFICATION

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:
>
> a. By being insured against liability to pay compensation by one or more insurers duly authorized to write compensation insurance in this state; and/or
>
> b. 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 his employees.

I am aware of the provisions of section 3700 of the Labor Code 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 provisions before commencing the performance of the Work of this Contract.

Date: _____

Name of DBE: _____

Signature: _____

Print Name: _____

Title: _____

(In accordance with Labor Code sections 1860 and 1861, the above certificate must be signed and filed with the awarding body prior to performing any Work under this Contract.)

END OF DOCUMENT

PREVAILING WAGE AND
RELATED LABOR REQUIREMENTS CERTIFICATION

I hereby certify that I will conform to the State of California Public Works Contract requirements regarding prevailing wages, benefits, on-site audits with 48-hours' notice, payroll records, and apprentice and trainee employment requirements, for all Work on the above Project including, without limitation, labor compliance monitoring and enforcement by the Department of Industrial Relations.

Date: _____

Name of DBE: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DISABLED VETERAN BUSINESS
ENTERPRISE PARTICIPATION CERTIFICATION

GENERAL INSTRUCTIONS

Pursuant to Education Code section 71028 and Public Contract Code section 10115, the District has a participation goal for disabled veteran business enterprises ("DVBE") of at least three percent (3%) per year of the overall dollar amount expended each year on District projects. Therefore, the DBE awarded the Contract must submit this document to the District with its executed Agreement, identifying the steps DBE took to solicit DVBE participation in conjunction with this Contract.

Part I – Method of Compliance with DVBE Participation Goals. Check the appropriate box to indicate your method of committing the contract dollar amount.

YOUR BUSINESS ENTERPRISE IS:	**AND YOU WILL**	**AND YOU WILL**
☐ Disabled veteran owned and your forces will perform at least 3% of this Contract	Include a copy of your DVBE letter from Office of Small Business and Disabled Veterans Business Enterprise Services ("OSB")*	Complete Part 1 of this form and the Certification
☐ Disabled veteran owned but is unable to perform 3% of this Contract with your forces	Use DVBE subcontractors /suppliers to bring the Contract participation to at least 3%	Include a copy of each DVBE's letter from OSB (including yours, if applicable), and complete Part 1 of this form and the certification
☐ **NOT** disabled veteran owned	Use DVBE subcontractors /suppliers for at least 3% of this Contract	
☐ Unable to meet the required participation goals after good faith efforts	Make good faith efforts, including contacts, advertisement and DVBE solicitation	Complete all of this Certification form

* A DVBE letter from OSB is obtained from the participating DVBE.

You must complete the following table to show the dollar amount of DVBE participation:

	TOTAL CONTRACT PRICE
A. Prime Bidder, if DVBE (own participation)	$
DVBE Subcontractor or Supplier	
Subtotal (A & B)	
Non-DVBE	
Total Bid	

Part II – Contacts. To identify DVBE subcontractors/suppliers for participation in your contract, you must contact each of the following categories. You should contact several DVBE organizations.

CATEGORY	**TELEPHONE NUMBER**	**DATE CONTACTED**	**PERSON CONTACTED**
The District, if any			*
OSB, which publishes a list of DVBE's; Internet Address: http://www.dgs.ca.gov/osbcr	(916) 323-5478 (916) 322-5060		*
DVBE Organization (List)			*

*Write "recorded message" in this column, if applicable.

Part III – Advertisement. You must advertise for DVBE participation in both a trade and focus paper. List the advertisement you place to solicit DVBE participation. Advertisements should be published at least fourteen (14) days prior to bid/proposal opening; if you cannot advertise fourteen (14) days prior, advertisements should be published as soon as possible. Advertisements must include that your firm is seeking DVBE participation, the project name and location, and you firm's name, your contact person, and telephone number. Attach copies of advertisements to this form.

FOCUS/TRADE PAPER NAME	**CHECK ONE**		**DATE OF ADVERTISEMENT**
	TRADE	**FOCUS**	

Part IV – DVBE Solicitations. List DVBE subcontractors/suppliers that were invited to bid. Use the following instructions to complete the remainder of this section (read the three columns as a sentence from left to right). If you need additional space to list DVBE solicitations, please use a separate page and attach to this form.

IF THE DVBE…..	**THEN…..**	**AND…..**
was selected to participate	Check "yes" in the "SELECTED" column	include a copy of their DVBE letter(s) from OSB
was **NOT** selected to participate	Check "NO" in the "SELECTED" column	state why in the "REASON NOT SELECTED" column
did not respond to your solicitation	Check the "NO RESPONSE" column.	

DISABLED VETERANS BUSINESS ENTERPRISES CONTACTED	**SELECTED**		**REASON NOT SELECTED**	**NO RESPONSE**
	YES	**NO**		

A copy of this form must be retained by you and may be subject to a future audit.

CERTIFICATION

I, _____, certify that I am the DBE's _____ and that I have made a diligent effort to ascertain the facts with regard to the representations made herein. In making this certification, I am aware of section 12650 et seq. of the Government Code providing for the imposition of treble damages for making false claims.

Date: _____

Name of DBE: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DRUG-FREE WORKPLACE CERTIFICATION

This Drug-Free Workplace Certification form is required from the successful Bidder pursuant to 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 doing 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. The prohibition on smoking includes the use of any electronic smoking device that creates an aerosol or vapor, in any manner or in any form, and the use of any oral smoking device for the purpose of circumventing the prohibition of tobacco smoking. Further, Health & Safety Code section 11362.3 prohibits the smoking or use of cannabis or cannabis products in any place where smoking tobacco is prohibited.

The District is not a "state agency" as defined in the applicable section(s) of the Government Code, but the District is a local agency and public school district under California law and requires all contractors on District projects to comply with the provisions and requirements of Government Code section 8350 et seq., the Drug-Free Workplace Act of 1990.

DBE shall certify that it will provide a drug-free workplace by doing all of the following:

a. 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.

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

   (1) The dangers of drug abuse in the workplace.

   (2) The person's or organization's policy of maintaining a drug-free workplace.

   (3) The availability of drug counseling, rehabilitation, and employee-assistance programs.

   (4) The penalties that may be imposed upon employees for drug abuse violations.

c. Requiring that each employee engaged in the performance of the contract or grant be given a copy of the statement required above, 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 publish a statement notifying employees concerning (a) the

prohibition of controlled substance at the workplace, (b) establishing a drug-free awareness program, and (c) requiring that each employee engaged in the performance of the Contract be given a copy of the statement required by section 8355(a), and requiring that the employee agree to abide by the terms of that statement.

I also understand that if the 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 the aforementioned Act.

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: _____

Name of DBE: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

TOBACCO-FREE ENVIRONMENT CERTIFICATION

Pursuant to, without limitation, 20 U.S.C section 6083, Labor Code section 6400 et seq., Health & Safety Code section 104350 et seq., and District Board policies, all District sites, including the Project site, are tobacco-free environments. Smoking and the use of tobacco products by all persons is prohibited on or in District property. District property includes school buildings, school grounds, school-owned vehicles and vehicles owned by others while on District property.

I acknowledge that I am aware of the District's policy regarding tobacco-free environments at District sites, including the Project site and hereby certify that I will adhere to the requirements of that policy and not permit any of my firm's employees, agents, subcontractors, or my firm's subcontractors' employees or agents, to use tobacco and/or smoke on the Project site.

Date: _____

Name of DBE: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

HAZARDOUS MATERIALS CERTIFICATION

DBE hereby certifies that no asbestos, or asbestos-containing materials, polychlorinated biphenyl (PCB), or any material listed by the federal or state Environmental Protection Agency or federal or state health agencies as a hazardous material, or any other material defined as being hazardous under federal or state laws, rules, or regulations ("New Hazardous Material"), shall be furnished, installed, or incorporated in any way into the Project or in any tools, devices, clothing, or equipment used to affect any portion of DBE's work on the Project for District.

DBE further certifies that it has instructed its employees with respect to the above-mentioned standards, hazards, risks, and liabilities.

Asbestos and/or asbestos-containing material shall be defined as all items containing but not limited to chrysotile, crocidolite, amosite, anthophyllite, tremolite, and actinolite. Any or all material containing greater than one-tenth of one percent (0.1%) asbestos shall be defined as asbestos-containing material.

Any disputes involving the question of whether or not material is New Hazardous Material shall be settled by electron microscopy or other appropriate and recognized testing procedure, at the District's determination. The costs of any such tests shall be paid by DBE if the material is found to be New Hazardous Material.

All Work or materials found to be New Hazardous Material or Work or material installed with equipment containing New Hazardous Material will be immediately rejected and this Work will be removed at DBE's expense at no additional cost to the District.

DBE has read and understood the document titled Hazardous Materials Procedures & Requirements, and shall comply with all the provisions outlined therein.

Date: _____

Name of DBE: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

LEAD-BASED MATERIALS CERTIFICATION

This certification provides notice to the DBE that:

(1) DBE's work may disturb lead-containing building materials.

(2) DBE shall notify the District if any work may result in the disturbance of lead-containing building materials.

(3) DBE shall comply with the Renovation, Repair and Painting Rule, if lead-based paint is disturbed in a six-square-foot or greater area indoors or a 20-square-foot or greater area outdoors.

1. Lead as a Health Hazard

Lead poisoning is recognized as a serious environmental health hazard facing children today. Even at low levels of exposure, much lower than previously believed, lead can impair the development of a child's central nervous system, causing learning disabilities, and leading to serious behavioral problems. Lead enters the environment as tiny lead particles and lead dust disburses when paint chips, chalks, peels, wears away over time, or is otherwise disturbed. Ingestion of lead dust is the most common pathway of childhood poisoning; lead dust gets on a child's hands and toys and then into a child's mouth through common hand-to-mouth activity. Exposures may result from construction or remodeling activities that disturb lead paint, from ordinary wear and tear of windows and doors, or from friction on other surfaces.

Ordinary construction and renovation or repainting activities carried out without lead-safe work practices can disturb lead-based paint and create significant hazards. Improper removal practices, such as dry scraping, sanding, or water blasting painted surfaces, are likely to generate high volumes of lead dust.

Because the DBE and its employees will be providing services for the District, and because the DBE's work may disturb lead-containing building materials, DBE IS HEREBY NOTIFIED of the potential presence of lead-containing materials located within certain buildings utilized by the District. All school buildings built prior to 1978 are presumed to contain some lead-based paint until sampling proves otherwise.

2. Overview of California Law

Education Code section 32240 et seq. is known as the Lead-Safe Schools Protection Act. Under this act, the Department of Health Services is to conduct a sample survey of schools in the State of California for the purpose of developing risk factors to predict lead contamination in public schools. (Ed. Code, § 32241.)

Any school that undertakes any action to abate existing risk factors for lead is required to utilize trained and state-certified contractors, inspectors, and workers. (Ed. Code, § 32243, subd. (b).) Moreover, lead-based paint, lead plumbing, and solders, or other potential sources of lead contamination, shall not be utilized in the construction of any new school facility or the modernization or renovation of any existing school facility. (Ed. Code, § 32244.)

Both the Federal Occupational Safety and Health Administration ("Fed/OSHA") and the California Division of Occupational Safety and Health ("Cal/OSHA") have implemented

safety orders applicable to all construction work where a contractor's employee may be occupationally exposed to lead.

The OSHA Regulations apply to all construction work where a contractor's employee may be occupationally exposed to lead. The OSHA Regulations contain specific and detailed requirements imposed on contractors subject to those regulations. The OSHA Regulations define construction work as work for construction, alteration, and/or repair, including painting and decorating. Regulated work includes, but is not limited to, the following:

a. Demolition or salvage of structures where lead or materials containing lead are present;

b. Removal or encapsulation of materials containing lead;

c. New construction, alteration, repair, or renovation of structures, substrates, or portions thereof, that contain lead, or materials containing lead;

d. Installation of products containing lead;

e. Lead contamination/emergency cleanup;

f. Transportation, disposal, storage, or containment of lead or materials containing lead on the site or location at which construction activities are performed; and

g. Maintenance operations associated with the construction activities described in the subsection.

Because it is assumed by the District that all painted surfaces (interior as well as exterior) within the District contain some level of lead, it is imperative that the DBE, its workers and subcontractors fully and adequately comply with all applicable laws, rules and regulations governing lead-based materials (including title 8, California Code of Regulations, section 1532.1).

DBE shall notify the District if any Work may result in the disturbance of lead-containing building materials. Any and all Work that may result in the disturbance of lead-containing building materials shall be coordinated through the District. A signed copy of this Certification shall be on file prior to beginning Work on the Project, along with all current insurance certificates.

3. <u>Renovation, Repair and Painting Rule, Section 402(c)(3) of the Toxic Substances Control Act</u>

The EPA requires lead safe work practices to reduce exposure to lead hazards created by renovation, repair and painting activities that disturb lead-based paint. Pursuant to the Renovation, Repair and Painting Rule (RRP), renovations in homes, childcare facilities, and schools built prior to 1978 must be conducted by certified renovations firms, using renovators with training by a EPA-accredited training provider, and fully and adequately complying with all applicable laws, rules and regulations governing lead-based materials, including those rules and regulations appearing within title 40 of the Code of Federal Regulations as part 745 (40 CFR 745).

The RRP requirements apply to all contractors who disturb lead-based paint in a six-square-foot or greater area indoors or a 20-square-foot or greater area outdoors. If a DPH-certified inspector or risk assessor determines that a home constructed before 1978

is lead-free, the federal certification is not required for anyone working on that particular building.

4. DBE's Liability

If the DBE fails to comply with any applicable laws, rules, or regulations, and that failure results in a site or worker contamination, the DBE will be held solely responsible for all costs involved in any required corrective actions, and shall defend, indemnify, and hold harmless the District, pursuant to the indemnification provisions of the Contract, for all damages and other claims arising therefrom.

If lead disturbance is anticipated in the Work, only persons with appropriate accreditation, registrations, licenses, and training shall conduct this Work.

It shall be the responsibility of the DBE to properly dispose of any and all waste products, including, but not limited to, paint chips, any collected residue, or any other visual material that may occur from the prepping of any painted surface. It will be the responsibility of the DBE to provide the proper disposal of any hazardous waste by a certified hazardous waste hauler. This company shall be registered with the Department of Transportation (DOT) and shall be able to issue a current manifest number upon transporting any hazardous material from any school site within the District.

The DBE shall provide the District with any sample results prior to beginning Work, during the Work, and after the completion of the Work. The District may request to examine, prior to the commencement of the Work, the lead training records of each employee of the DBE.

THE DBE HEREBY ACKNOWLEDGES, UNDER PENALTY OF PERJURY, THAT IT:

1. HAS RECEIVED NOTIFICATION OF POTENTIAL LEAD-BASED MATERIALS ON THE OWNER'S PROPERTY;

2. IS KNOWLEDGEABLE REGARDING AND WILL COMPLY WITH ALL APPLICABLE LAWS, RULES, AND REGULATIONS GOVERNING WORK WITH, AND DISPOSAL, OF LEAD.

THE UNDERSIGNED WARRANTS THAT HE/SHE HAS THE AUTHORITY TO SIGN ON BEHALF OF AND BIND THE DBE. THE DISTRICT MAY REQUIRE PROOF OF SUCH AUTHORITY.

Date: _____

Name of DBE: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

IMPORTED MATERIALS CERTIFICATION

This form shall be executed by all entities that, in any way, provide or deliver and/or supply any soils, aggregate, or related materials ("Fill") to the Project Site and shall be provided to the District at least ten (10) days before delivery. All Fill shall satisfy all requirements of any environmental review of the Project performed pursuant to the statutes and guidelines of the California Environmental Quality Act, section 21000 et seq. of the Public Resources Code ("CEQA"), and all requirements of section 17210 et seq. of the Education Code, including requirements for a Phase I environmental assessment acceptable to the State of California Department of Education and Department of Toxic Substances Control.

Certification of: □ Delivery Firm/Transporter □ Supplier □ Manufacturer
□ Wholesaler □ Broker □ Retailer
□ Distributor □ Other _____

Type of Entity □ Corporation □ General Partnership
□ Limited Partnership □ Limited Liability Company
□ Sole Proprietorship □ Other _____

Name of firm ("Firm"): _____

Mailing address: _____

Addresses of branch office used for this Project: _____

If subsidiary, name and address of parent company: _____

_____

By my signature below, I hereby certify that I am aware of section 25260 of the Health and Safety Code and the sections referenced therein regarding the definition of hazardous material. I further certify on behalf of the Firm that all soils, aggregates, or related materials provided, delivered, and/or supplied or that will be provided, delivered, and/or supplied by this Firm to the Project Site are free of any and all hazardous material as defined in section 25260 of the Health and Safety Code. I further certify that I am authorized to make this certification on behalf of the Firm.

Date: _____

Name of Firm: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

SKILLED AND TRAINED WORKFORCE CERTIFICATION

The undersigned does hereby certify to the governing board of the District as follows:

That I am a representative of DBE currently performing work on the Project; that I am familiar with the facts herein certified; and that I am authorized and qualified to execute this certificate on behalf of DBE.

That DBE and its subcontractors at every tier will use a Skilled and Trained Workforce to perform all work on the Contract or Project that falls within an apprenticeable occupation in the building and construction trades in accordance with Public Contract Code section 2600 et seq.

"Apprenticeable occupation" means an occupation for which the Chief of the Division of Apprenticeship Standards of the Department of Industrial Relations ("Chief") had approved an apprenticeship program pursuant to Section 3075 of the Labor Code before January 1, 2014.

"Skilled and Trained Workforce" means a workforce that meets all of the following conditions:

1. All of the workers are either skilled journeypersons or apprentices registered in an apprenticeship program approved by the Chief.

2. The percentage of either (A) skilled journeypersons employed by DBE or subcontractor to perform work on the Contract or Project who are graduates of an apprenticeship program for the applicable occupation, or (B) hours of work performed by skilled journeypersons employed by DBE or subcontractor to perform work on the Contract or Project who are graduates of an apprenticeship program for the applicable occupation, is at least equal to the percentages set forth in the following chart for the applicable month:

REQUIREMENT	OCCUPATIONS
0%	Teamster
At least 30%	Acoustical installer, bricklayer, carpenter, cement mason, drywall installer or lather, marble mason, finisher, or setter, modular furniture or systems installer, operating engineer, pile driver, plasterer, roofer or waterproofer, stone mason, surveyor, terrazzo worker or finisher, and tile layer, setter, or finisher
At least 60%	Remaining apprenticeable occupations

3. For an apprenticeable occupation in which no apprenticeship program has been approved by the Chief before January 1, 1995, up to one-half of the above graduation percentage requirements set forth in the above chart may be satisfied by skilled journeypersons who commenced working in the apprenticeable occupation before the Chief's approval of an apprenticeship program for that occupation in the county in which the Project is located.

4. The contractor or subcontractor need not meet the apprenticeship graduation requirements if:

   a. During a calendar month, DBE or subcontractor employs skilled journeypersons to perform fewer than 10 hours of work on the Contract or Project; or

   b. The subcontractor was not a listed subcontractor under Public Contract Code section 4104 or a substitute for a listed subcontractor and the subcontract does not exceed one-half of 1 percent of the price of the prime contract.

That DBE and its subcontractors will demonstrate its compliance with the Skilled and Trained Workforce requirements by either of the following methods (check what applies):

☐ Using the form attached hereto, provide monthly reports to the District from DBE and its subcontractors demonstrating that they are complying with the requirements of Public Contract Code section 2600 et seq., which shall be a public record under California Public Records Act, Government Code section 6250 et seq.; or

☐ Provide evidence that DBE and its subcontractors have agreed to be bound by: (1) a project labor agreement entered into by the District that binds all contractors and all its subcontractors at every tier performing work on the Project to use a skilled and trained workforce; (2) the extension or renewal of a project labor agreement entered into by the District prior to January 1, 2017; or (3) a project labor agreement that binds all contractors and all its subcontractors at every tier performing work on the Project to use a skilled and trained workforce.

I hereby certify that I am aware of the provisions of section 17407.5 of the Education Code and sections 2600 through 2602 of the Public Contract Code and will comply with such provisions during the performance of the Work of this Contract and will bind all of my subcontractors at every tier, with the exception of the subcontractors identified in Public Contract Code section 2602, to comply with such provisions.

Date: _____

Proper Name of DBE: _____

Signature: _____

Print Name: _____

Title: _____

SKILLED AND TRAINED WORKFORCE
MONTHLY REPORT
(COVER PAGE)

NAME OF PROJECT: **Substation #3 & #4 Project**

NAME OF CONTRACTOR: _____

FOR THE MONTH OF: _____, 20_____

The undersigned hereby certifies that all the workers employed by the above-referenced contractor performing work in an apprenticeable occupation in the building and construction trades on the Project are either skilled journeypersons or apprentices registered in an apprenticeship program approved by the Chief of the Division of Apprenticeship Standards of the Department of Industrial Relations.

The undersigned further certifies that the percentage of either (A) skilled journeypersons employed by the above-referenced contractor to perform work on the Project who are graduates of an apprenticeship program for the applicable occupation, or (B) hours of work performed by skilled journeypersons employed by the above-referenced contractor to perform work on the Project who are graduates of an apprenticeship program for the applicable occupation, is at least equal to the apprenticeship graduation percentage required by Public Contract Code section 2601 for the particular calendar month.

The undersigned has demonstrated compliance with the apprenticeship graduation percentage by completing the accompanying Worksheet(s). A true and correct Worksheet for each apprenticeable occupation in the building and construction trades utilized by the above-referenced contractor for the particular calendar month is attached hereto, **totaling _____ attached page(s)**.

I certify under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Date: _____

Signature: _____

Print Name: _____

Title: _____

SKILLED AND TRAINED WORKFORCE
MONTHLY REPORT
(WORKSHEET)

NAME OF PROJECT: **Substation #3 & #4 Project**

NAME OF CONTRACTOR: _____

FOR THE MONTH OF: _____ 20__

Page ___ of ___ (Duplicate as needed. Submit a separate Worksheet for each apprenticeable occupation in the building and construction trades utilized by contractor.)

***Apprenticeable occupation: _____.**

A. If above-identified occupation is *acoustical installer, bricklayer, carpenter, cement mason, drywall installer or lather, marble mason, finisher, or setter, modular furniture or systems installer, operating engineer, pile driver, plasterer, roofer or waterproofer, stone mason, surveyor, terrazzo worker or finisher, and tile layer, setter, or finisher*, the apprenticeship graduation percentage requirement is at least 30 percent.

B. If the above-identified occupation is any other apprenticeable occupation, *excluding teamsters and occupations listed in subparagraph A, above*, the apprenticeship graduation percentage requirement is at least 60 percent.

Demonstrate compliance for the above-identified occupation by either Number of Skilled Journeypersons or Number of Hours of Work Performed by Skilled Journeypersons. Check and complete the method of compliance that applies:

☐ **Number of Skilled Journeypersons**:

1. Number of skilled journeypersons performing work in the apprenticeable occupation: _____
2. Number of skilled journeypersons who are graduates of an apprenticeship program for the applicable occupation: _____

Percentage of skilled journeypersons who are graduates of an apprenticeship program for the applicable occupation (divide line 2 by line 1): _____ %

☐ **Number of Hours of Work Performed by Skilled Journeypersons**:

1. Number of hours of work performed by skilled journeypersons in the apprenticeable occupation: _____
2. Number of hours of work performed by skilled journeypersons who are graduates of an apprenticeship program for the applicable occupation: _____

Percentage of hours of work performed by skilled journeypersons who are graduates of an apprenticeship program for the applicable occupation (divide line 2 by line 1): _____ %

*This Worksheet incorporates by reference all definitions in Public Contract Code section 2601, including, without limitation, the definitions of "apprenticeable occupation," "graduate of an apprenticeship program," and "skilled journeypersons."

END OF DOCUMENT

ESCROW AGREEMENT IN LIEU OF RETENTION
Public Contact Code Section 22300

This Escrow Agreement ("Escrow Agreement") is made and entered into this _____ day of _____, 2022, by and between the Solano Community College District ("District"), whose address is 4000 Suisun Valley Road, Fairfield, CA 94534, and _____ _____ ("DBE"), whose address is _____ _____, and _____ ("Escrow Agent"), a state or federally chartered bank in the state of California, whose address is _____ _____.

For the consideration hereinafter set forth, District, DBE, and Escrow Agent agree as follows:

1. Pursuant to section 22300 of Public Contract Code of the State of California, which is hereby incorporated by reference, DBE has the following two (2) options:

   ☐ Deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by District pursuant to the Construction Contract No.___ entered into between District and DBE for the _____ _____ Project, in the amount of _____ Dollars ($_____) dated, _____, 2022, (the "Contract"); **or**

   ☐ On written request of DBE, District shall make payments of the retention earnings for the above referenced Contract directly to Escrow Agent.

   When DBE deposits the securities as a substitute for Contract earnings (first option), Escrow Agent shall notify District within ten (10) calendar days of the deposit. The market value of the securities at the time of substitution and at all times from substitution until the termination of the Escrow Agreement shall be at least equal to the cash amount then required to be withheld as retention under terms of Contract between District and DBE.

   Securities shall be held in name of Solano Community College District, and shall designate DBE as beneficial owner.

2. District shall make progress payments to DBE for those funds which otherwise would be withheld from progress payments pursuant to Contract provisions, provided that Escrow Agent holds securities in form and amount specified above.

3. When District makes payment of retention earned directly to Escrow Agent, Escrow Agent shall hold them for the benefit of DBE until the time that the escrow created under this Escrow Agreement is terminated. DBE may direct the investment of the payments into securities. All terms and conditions of this Escrow Agreement and the rights and responsibilities of the Parties shall be equally applicable and binding when District pays Escrow Agent directly.

4. DBE shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account, and all expenses of District. The District

will charge DBE $_____ for each of District's deposits to the escrow account. These expenses and payment terms shall be determined by District, DBE, and Escrow Agent.

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

6. DBE 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 District to Escrow Agent that District consents to withdrawal of amount sought to be withdrawn by DBE.

7. District shall have the right to draw upon the securities and/or withdraw amounts from the Escrow Account in the event of default by DBE. Upon seven (7) days' written notice to Escrow Agent from District of the default, if applicable, Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by District.

8. Upon receipt of written notification from District certifying that the Contract is final and complete, and that DBE has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to DBE 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 monies and securities on deposit and payments of fees and charges.

9. Escrow Agent shall rely on written notifications from District and DBE pursuant to Paragraphs 5 through 8, inclusive, of this Escrow Agreement and District and DBE shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of securities and interest as set forth above.

[REMAINDER OF PAGE INTENTIONALLY BLANK]

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

On behalf of District:	On behalf of DBE:
Title	Title
Name	Name
Signature	Signature
Address	Address

On behalf of Escrow Agent:

Title

Name

Signature

Address

At the time that the Escrow Account is opened, District and DBE shall deliver to Escrow Agent a fully executed copy of this Agreement.

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

On behalf of District:	On behalf of DBE:
Title	Title
Name	Name
Signature	Signature
Address	Address

END OF DOCUMENT

WARRANTY FORM

_____ ("Contractor") hereby agrees that the _____ _____ ("Work" of Contractor) which Contractor has installed for the Solano Community College District ("District") for the following project:

Substation #3 & #4 Project

("Project" or "Contract") has been performed in accordance with the requirements of the Contract Documents and that the Work as installed will fulfill the requirements of the Contract Documents.

The undersigned agrees to repair or replace any or all of such Work that may prove to be defective in workmanship or material together with any other adjacent Work that may be displaced in connection with such replacement within a period of two (2) year(s) from the date of completion as defined in Public Contract Code section 7107, subdivision (c), ordinary wear and tear and unusual abuse or neglect excepted. The date of completion is _____, 20___.

In the event of the undersigned's failure to comply with the above-mentioned conditions within a reasonable period of time, as determined by the District, but not later than seven (7) days after being notified in writing by the District, the undersigned authorizes the District to proceed to have said defects repaired and made good at the expense of the undersigned. The undersigned shall pay the costs and charges therefor upon demand.

Date: _____

Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

Representatives to be contacted for service subject to terms of Contract:

Name: _____

Address: _____

Phone NO.: _____

END OF DOCUMENT

AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS

THIS AGREEMENT AND RELEASE OF CLAIMS ("Agreement and Release") IS MADE AND ENTERED INTO THIS _____ DAY OF _____, 20___ by and between the Solano Community College District ("District") and _____ _____ ("DBE"), whose place of business is _____ _____.

RECITALS

WHEREAS, District and DBE entered into a Design-Build Contract for the following project: Substation #3 & 4 Replacement Project ("Contract" or "Project") in the County of Solano, California.

WHEREAS, the Work under the Contract was completed on _____, 20___ and a Notice of Completion was recorded with the County Recorder on _____, 20___.

NOW, THEREFORE, it is mutually agreed between District and DBE as follows:

AGREEMENT

1. DBE will only be assessed liquidated damages as detailed below:

Original Contract Price	$_____
Modified Contract Price	$_____
Payment to Date	$_____
Liquidated Damages	$_____
Payment Due DBE	$_____

2. Subject to the provisions hereof, District shall forthwith pay to DBE the undisputed sum of _____ Dollars ($_____) under the Contract, less any amounts represented by any notice to withhold funds on file with District as of the date of such payment.

3. DBE acknowledges and hereby agrees that there are no unresolved or outstanding claims in dispute against District arising from the performance of work under the Contract, except for the claims described in Paragraph 4 and continuing obligations described in Paragraph 6. It is the intention of the parties in executing this Agreement and Release that this Agreement and Release shall be effective as a full, final and general release of all claims, demands, actions, causes of action, obligations, costs, expenses, damages, losses and liabilities of DBE against District and all of its respective agents, employees, trustees, inspectors, assignees, consultants and transferees, except for any Disputed Claim that may be set forth in Paragraph 4 and the continuing obligations described in Paragraph 6 hereof.

4. The following claims are disputed (hereinafter, the "Disputed Claims") and are specifically excluded from the operation of this Agreement and Release:

Claim No.	Description of Claim	Amount of Claim	Date Claim Submitted
_____	_____	$_____	_____
_____	_____	$_____	_____
_____	_____	$_____	_____
_____	_____	$_____	_____
_____	_____	$_____	_____
_____	_____	$_____	_____

[If further space is required, attach additional sheets showing the required information.]

5. Consistent with California Public Contract Code section 7100, DBE hereby agrees that, in consideration of the payment set forth in Paragraph 2 hereof, DBE hereby releases and forever discharges District, all its agents, employees, inspectors, assignees, and transferees from any and all liability, claims, demands, actions, or causes of action of whatever kind or nature arising out of or in any way concerned with the Work under the Contract.

6. Guarantees and warranties for the Work, and any other continuing obligation of Design/Builder, including without limitation the duty to defend, indemnify and hold harmless the District, shall remain in full force and effect as specified in the Contract Documents.

7. DBE hereby waives the provisions of California Civil Code section 1542 which provides as follows:

> A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS THAT THE CREDITOR OR RELEASING PARTY DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE AND THAT, IF KNOWN BY HIM OR HER, WOULD HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR OR RELEASED PARTY.

8. The provisions of this Agreement and Release are contractual in nature and not mere recitals and shall be considered independent and severable. If any such provision or any part thereof shall be at any time held invalid in whole or in part under any federal, state, county, municipal, or other law, ruling, or regulations, then such provision, or part thereof, shall remain in force and effect to the extent permitted by law, and the remaining provisions of this Agreement and Release shall also remain in full force and effect, and shall be enforceable.

9. All rights of District shall survive completion of the Work or termination of Contract, and execution of this Release.

* * * CAUTION: THIS IS A RELEASE - READ BEFORE EXECUTING * * *

SOLANO COMMUNITY COLLEGE DISTRICT:

Signature: _____

Print Name: _____

Title: _____

DBE: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DOCUMENT 00 41 13
PROPOSAL FORM

To: Solano Community College District ("District" or "Owner")

From: _____
(Proper Name of Bidder)

The undersigned declares that proposer has read and understands the Contract Documents, and agrees and proposes to furnish all necessary labor, materials, and equipment to perform and furnish all work in accordance with the terms and conditions of the Contract Documents, including, without limitation, the Request for Proposals and Attachments A thru D, for the following project known as:

Substation #3 &#4 Replacement Project

and will accept payment for that Work as follows:

Tab 8a – Price Proposal: Design Lump Sum Costs

_____

_____dollars

$_____

Tab 8b – Price Proposal: Construction Fee

_____percent %

Tab 8c – Price Proposal: General Conditions lump Sum Costs

_____

_____dollars

$_____

Tab 8d – Price Proposal: Subcontractor/change order overhead and profit mark-up

_____percent %

Total Insurance, taxes and Bond Premium costs to be charged on cost of work:

1. _____ _____percent (%)
2. _____ _____percent (%)
3. _____ _____percent (%)
4. _____ _____percent (%)
5. _____ _____percent (%)
6. _____ _____percent (%)
7. _____ _____percent (%)
8. _____ _____percent (%)
9. _____ _____percent (%)
10. _____ _____percent (%)

Total _____percent (%)

Design-Build Entity Staffing included in General Conditions:

11. DBE – Project Manager _____hrs/week
12. DBE – Design Manager _____hrs/week
13. DBE – Superintendent _____hrs/week
14. AOR – Lead Architect _____hrs/week
15. Mech – Lead Mechanical Engineer _____hrs/week
16. Elect – Lead Electrical Engineer _____hrs/week
17. Other: _____hrs/week
18. Other: _____hrs/week
19. Other: _____hrs/week
20. Other: _____hrs/week
21. Other: _____hrs/week
22. Other: _____hrs/week

1. The undersigned has reviewed the Work outlined in the Contract Documents and fully understands the scope of Work required in this Proposal, understands the construction and project management function(s) is described in the Contract Documents, and that each proposer who is awarded a contract shall be in fact a prime contractor, not a subcontractor, to the District, and agrees that its Proposal, if accepted by the District, will be the basis for the proposer to enter into a contract with the District in accordance with the intent of the Contract Documents.

2. The undersigned has notified the District in writing of any discrepancies or omissions or of any doubt, questions, or ambiguities about the meaning of any of the Contract Documents, and has contacted the Construction Manager before bid date to verify the issuance of any clarifying Addenda.

3. The undersigned agrees to commence work under this Contract on the date established in the Contract Documents and to complete all work within the time specified in the Contract Documents.

4. The liquidated damages clause of the General Conditions and Agreement is hereby acknowledged.

5. It is understood that the District reserves the right to reject this proposal and that the bid shall remain open to acceptance and is irrevocable for a period of ninety (120) days.

6. The following executed documents are attached hereto:

   - Bid Bond on the District's form or other security.
   - Non-Collusion Declaration.
   - Iran Contracting Act Certification.
   - Site Certification Visit.
   - PLA – Letter of Assent

7. Receipt and acceptance of the following Addenda is hereby acknowledged:

No._____, Dated _____	No._____, Dated _____
No._____, Dated _____	No._____, Dated _____
No._____, Dated _____	No._____, Dated _____

8. Proposer acknowledges that the license required for performance of the Work is a , B – General Contracting License.

9. proposer hereby certifies that proposer is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the Work.

10. Proposer specifically acknowledges and understands that if it is awarded the Contract, that it shall perform the Work of the Project while complying with all requirements of the Department of Industrial Relations.

11. Proposer hereby certifies that its proposal includes sufficient funds to permit proposer to comply with all local, state or federal labor laws or regulations during the Project, including payment of prevailing wage, and that proposer will comply with the provisions of Labor Code section 2810(d) if awarded the Contract.

12. Proposer agrees to comply with all requirements of the Project Labor Agreement.

13. The Proposer represents that it is competent, knowledgeable, and has special skills with respect to the nature, extent, and inherent conditions of the Work to be performed. Proposer further acknowledges that there are certain peculiar and inherent conditions existent in the construction of the Work that may create, during the Work, unusual or peculiar unsafe conditions hazardous to persons and property.

14. Proposer expressly acknowledges that it is aware of such peculiar risks and that it has the skill and experience to foresee and to adopt protective measures to adequately and safely perform the Work with respect to such hazards.

15. Proposer expressly acknowledges that it is aware that if a false claim is knowingly submitted (as the terms "claim" and "knowingly" are defined in the California False Claims Act, Gov. Code, § 12650 et seq.), the District will be entitled to civil remedies set forth in the California False Claim Act. It may also be considered fraud and the Contractor may be subject to criminal prosecution.

16. The undersigned Proposer certifies that it is, at the time of proposing, and shall be throughout the period of the Contract, licensed by the State of California to do the type of work required under the terms of the Contract Documents and registered as a public works contractor with the Department of Industrial Relations. Proposer further certifies that it is regularly engaged in the general class and type of work called for in the Contract Documents.

Furthermore, Proposer hereby certifies to the District that all representations, certifications, and statements made by Proposer, as set forth in this Proposal, are true and correct and are made under penalty of perjury.

Dated this_____day of_____20 ____

Name of Proposer: _____

Type of Organization: _____

Signed by: _____

Title of Signer: _____

Address of Proposer: _____

Taxpayer Identification No. of Proposer: _____

Telephone Number: _____

Email:_____web Page: _____

Contractor's License No(s): No.:_____Class:_____Expiration Date: _____

No.:_____Class:_____Expiration Date: _____

No.:_____Class:_____Expiration Date: _____

Public Works Contractor Registration No.: _____

END OF DOCUMENT

SITE VISIT CERTIFICATION

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID
IF SITE VISIT WAS MANDATORY

PROJECT: **Substation 3 &4 Replacement**

Check option that applies:

_____ I certify that I visited the Site of the proposed Work, received the attached pages of information, and became fully acquainted with the conditions relating to construction and labor. I fully understand the facilities, difficulties, and restrictions attending the execution of the Work under contract.

_____ I certify that _____ (Bidder's representative) visited the Site of the proposed Work, received the attached ___ pages of information, and became fully acquainted with the conditions relating to construction and labor. The Bidder's representative fully understood the facilities, difficulties, and restrictions attending the execution of the Work under contract.

Bidder fully indemnifies the Solano Community College District, its Architect, its Engineers, its Construction Manager, its Program Manager, and all of their respective officers, agents, employees, and consultants from any damage, or omissions, related to conditions that could have been identified during my visit and/or the Bidder's representative's visit to the Site.

I certify under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Date: _____

Proper Name of Bidder: _____

Signature: _____

Print Name: _____

Title: _____

ATTACHMENTS:

1.

2.

3.

END OF DOCUMENT

NON-COLLUSION DECLARATION
(Public Contract Code Section 7106)

The undersigned declares:

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

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]

Date: _____

Proper Name of Bidder: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DOCUMENT 00 45 20.01
PROJECT LABOR AGREEMENT

SOLANO COMMUNITY COLLEGE DISTRICT
PROJECT LABOR AGREEMENT

This Agreement is entered into this 5th day of December, 2013 by and between the Solano Community College District (hereinafter, the "District"), together with contractors and/or subcontractors, who become signatory to this Agreement by signing the "Agreement To Be Bound" (Addendum A) (all of whom are referred to herein as "Contractors/Employers"), and the Napa-Solano Building & Construction Trades Council ("Council") and its affiliated local Unions that have executed this Agreement (all of whom are referred to collectively as "Union" or "Unions").

The purpose of this Agreement is to promote efficiency of construction operations during the Solano Community College District's Measure Q and other construction project(s) ("Project") as defined herein, and to provide for peaceful settlement of labor disputes and grievances without strikes or lockouts, thereby promoting the public interest in assuring the timely and economical completion of the Project. The District and the Council may mutually agree in writing to add additional components to the Project's Scope of Work to be covered under this PLA. The District and the Labor Council seek to form a lasting relationship to Career Technical Education, especially among those underrepresented in the trades (women, minorities, and veterans).

WHEREAS, the timely and successful completion of the Project is of the utmost importance to the Solano Community College District to meet the educational needs of the District's students and to avoid increased costs resulting from delays in construction; and

WHEREAS, large numbers of workers of various skills will be required in the performance of the construction work, including those to be represented by the unions signatory to this Agreement and employed by contractors and subcontractors who are also signatory to this Agreement; and

WHEREAS, it is recognized that on a project of this magnitude with multiple bargaining units on the job site at the same time over an extended period of time, the potential for work disruption is substantial without an overriding commitment to maintain continuity of work; and

WHEREAS, the interests of the general public, the District, the Unions and the Contractor/Employer(s) would be best served if the construction work proceeded in an orderly manner without disruption because of strikes, sympathy strikes, work stoppages, picketing, lockouts, slowdowns or other interferences with work; and

WHEREAS, the Contractor/Employers and the Unions desire to mutually establish and stabilize wages, hours and working conditions for the workers employed on the Project by the Contractor/Employer(s), and further, to encourage close cooperation among the Contractor/Employer(s) and the Union(s) so that a satisfactory, continuous and harmonious relationship will exist among the Parties to this Agreement; and

WHEREAS, the Parties agree that one of the primary purposes of this Agreement is to avoid the tensions that might arise on the Project if Union and non-union workers of different employers were to work side by side on the Project thereby leading to labor disputes that could delay completion of the Project; and

WHEREAS, the Agreement is not intended to replace, interfere with, abrogate, diminish or modify existing local or national collective bargaining agreements in effect during the duration of the Project, insofar as a legally binding agreement exists between the Contractor/Employer(s) and the affected Union(s), except to the extent that the provisions of this Agreement are inconsistent with said collective bargaining agreements, in which event, the provisions of this Agreement shall prevail; and

WHEREAS, the contract for construction work on the Project will be awarded in accordance with the applicable provisions of the Public Contract Code, Education Code and other applicable California law; and

WHEREAS, funding for the construction of the Project will come from Measure Q, passed by the Solano County residents in 2012, in contrast to typical California school projects, which are funded through a balance of local and State funds; and

WHEREAS, the District has the absolute right to select the lowest responsive and responsible bidder for the award of the construction contract on the Project, or to reject all bid proposals, or to use other legal project delivery methodologies; and

WHEREAS, the District places high priority upon the development of comprehensive programs for the recruitment, training and employment of local area residents and recognizing the ability of local apprenticeship programs to provide meaningful and sustainable careers in the building and construction industry; and

WHEREAS, the Parties to this Agreement pledge their full good faith and trust to work towards a mutually satisfactory completion of the Project;

NOW, THEREFORE, IT IS AGREED BETWEEN AND AMONG THE PARTIES HERETO, AS FOLLOWS:

ARTICLE 1
DEFINITIONS

1.1 "Agreement" means this Project Labor Agreement.

1.2 "District" means the Solano Community College District, its employees, agents, and administrative staff.

1.3 "Contractor/Employer(s)" means any individual, firm, partnership or corporation, or combination thereof, including joint ventures, that is an independent business enterprise and enters into a contract with the District or any of its contractors or subcontractors of any tier, with respect to the construction of any part of the Project under contract terms and conditions approved by the District and which incorporate this Agreement.

1.4 "Construction Contract" means the public works or improvement contract(s) which will be signed by the District and which are necessary to complete the Project, as defined herein, including subcontracts at any tier.

1.5 "Project" is defined to include all public works or improvement project(s) or construction projects funded in whole or in part with Measure Q funding with an

estimated construction cost of $4.5 million or more. In addition, "Project" includes Building 600 (Administration Building); Building 1200 (Theater Modernization) and Building 200 (Child Development Center). Routine maintenance of District properties (per Public Contract Code section 20656) and emergency public works projects (per Public Contract Code section 20654) are not covered by the scope of this Agreement. The District and the Council may mutually agree in writing to add additional components to the Project's Scope of Work to be covered under this PLA.

1.6 "Union" or "Unions" means the Napa-Solano Building & Construction Trades Council, AFL-CIO, ("the Council") and any affiliated labor organization signatory to this Agreement, acting in their own behalf and on behalf of their respective affiliates and member organizations whose names are subscribed hereto and who have through their officers executed this Agreement ("Signatory Unions").

1.7 "Project Manager" means the person(s) or business entity(ies) designated by the District to oversee all phases of construction on the Project and to oversee the implementation of this Agreement and who works under the guidance of the District's Authorized Representative.

1.8 "Master Agreement" or "Schedule A" means the Master Collective Bargaining Agreement of each craft Union signatory hereto, a copy of which shall be on file with the District.

1.9 "Council" means the Napa-Solano Counties Building & Construction Trades Council.

ARTICLE 2
SCOPE OF AGREEMENT

2.1 Parties: The Agreement shall apply and is limited to all Contractors/Employer(s) performing work on the Project (including subcontractors at any tier), the District the Council and the Unions signatory to this Agreement, acting on their own behalf and on behalf of their respective affiliates and member organizations whose names are subscribed hereto and who have through their officers executed this Agreement ("Signatory Unions").

2.2 Project Description: The Agreement applies to all prospective public works or improvement project(s) or construction projects funded in whole or in part with Measure Q funding using with an estimated construction cost of $4.5 million or more. In addition, this Agreement applies to construction and/or modernization of Building 600 (Administration Building); Building 1200 (Theater Modernization) and Building 200 (Child Development Center). Routine maintenance of District properties (per Public Contract Code section 20656) and emergency public works projects (per Public Contract Code section 20654) are not covered by the scope of this Agreement. The District and the Council may mutually agree in writing to add additional components to the Project's Scope of Work to be covered under this PLA.

2.3 Covered Work: This Agreement covers, without limitation, all on-site site preparation, surveying, construction, alteration, demolition, installation, painting or repair of buildings, structures and other works, and related activities for the Project, including landscaping and temporary fencing that is within the craft jurisdiction of one of the Unions and which is directly or indirectly part of the Project, including, without limitation to the following examples, pipelines (including those in linear corridors built to serve the project), pumps, pump stations, start-up, modular furniture installation, and on-site soils and material inspection and testing to be performed to complete the Project. On-site work includes work done for the Project in temporary yards or areas adjacent to the Project, and at any on-site or off-site batch plant constructed solely to supply materials to the Project. This scope of work includes all soils and materials testing and inspection where such testing and inspection is a classification in which a prevailing wage determination has been published.

2.3.1 This Agreement shall apply to any start-up, calibration, performance testing, repair, maintenance, operational revisions to systems and/or subsystems performed after Completion unless it is performed by District employees.

2.3.2 This Agreement covers all on-site fabrication work over which the District, Contractor(s) or subcontractor(s) possess the right of control (including work done for the Project in any temporary yard or area established for the Project.). Additionally, it is agreed hereby that this Agreement covers any off-site work, including fabrication necessary for the Project defined herein, that is covered by a current Schedule A Agreement or local addenda to a National Agreement of the applicable Union(s) that is in effect as of the execution date of this Agreement.

2.3.3 It is expressly agreed and understood by the Parties that the District shall have the right to purchase material and equipment from any source and the craftspersons covered under this Agreement will handle and install such material and equipment. There shall be no limitation or restriction upon the choice of materials or upon the full use and installation of equipment, machinery, package units, factory pre-cast, prefabricated or preassembled materials, tools or other labor-saving devices other than as set forth herein. The lawful fabrication provisions of the appropriate national or local agreements shall be applicable.

2.3.4 The furnishing of supplies, equipment or materials which are stockpiled for later use shall in no case be considered subcontracting. Construction trucking work, such as the delivery of ready-mix, asphalt, aggregate, sand or other fill material which are directly incorporated into the construction process as well as the off-hauling of debris and excess fill material and/or mud, shall be covered by the terms and conditions of this Agreement, to the fullest extent provided by law and by prevailing wage determinations of the California Department of Industrial Relations. Contractor/Employer(s), including brokers, of persons providing construction trucking work shall provide certified payroll records to the District within ten (10) days of written request or as required by bid specifications.

2.3.5 Work covered under this Agreement within the craft jurisdiction of the Elevator Constructors will be performed under the terms of the National Agreement of the International Union of Elevator Constructors except that Articles IV and XIII of the Agreement shall prevail and be applied to such work. Work covered by the Agreement within the craft jurisdiction of the Boilermakers will be performed under the terms of the National Transient Lodge (NTL) Articles of Agreement except that Articles IV and XIII of the Agreement shall prevail and be applied to such work. Work covered by the Agreement within the NTL Articles of Agreement, the National Stack/Chimney Agreement, the National Cooling Tower Agreement, all instrument calibration work and loop checking shall be performed under the terms of the UA/IBEW Joint National Agreement for Instrument and Control Systems Technicians, except that Articles IV and XIII of the Agreement shall prevail and be applied to such work.

2.4 Exclusions. The following shall be excluded from the scope of this Agreement:

2.4.1 The Agreement is not intended to, and shall not affect or govern the award of public works contracts by the District which are not included in the Project.

2.4.2 The Agreement shall not apply to a Contractor/Employer's non construction craft employees, including but not limited to executives, managerial employees, engineering employees and supervisors above the level of General Foreman (except those covered by existing Master Agreements), staff engineers or other professional engineers, administrative and management.

2.4.3 This Agreement shall not apply to any work performed on or near or leading to the site of work covered by this Agreement that is undertaken by state, county, city or other governmental bodies or their contractors; or by public or private utilities or their contractors.

2.4.4 The District shall not be required to comply with this Agreement for any work performed with its own forces as permitted by the Public Contract Code and Education Code.

2.4.5 This Agreement shall not apply to off-site maintenance of leased equipment and on-site supervision of such work;

2.4.6 This Agreement shall not apply to engineering provided by professional service organizations and laboratory or specialty testing or inspection not ordinarily done by the Unions;

2.4.7 This Agreement shall not apply to routine maintenance of District properties and emergency public works projects.

2.5 Award of Contracts: It is understood and agreed that the District shall have the absolute right to select any qualified bidder for the award of contracts under this Agreement. The bidder need only be willing, ready and able to execute and comply with this Agreement.

ARTICLE 3
EFFECT OF AGREEMENT

3.1 By executing the Agreement, the Unions and the District agree to be bound by each and all of the provisions of the Agreement.

3.2 By accepting the award of a Construction Contract for the Project, whether as contractor or subcontractor, the Contractor/Employer agrees to be bound by each and every provision of the Agreement and agrees that it will evidence its acceptance prior to the commencement of work by executing the **Letter of Assent** in the form attached hereto as **Addendum A**.

3.3 At the time that any Contractor/Employer enters into a subcontract with any subcontractor providing for the performance of a construction contract, the Contractor/Employer(s) shall provide a copy of this Agreement, as it may from time to time be modified, to said subcontractor and shall require the subcontractor as a part of accepting an award of a construction subcontract to agree in writing to be bound by each and every provision of this Agreement prior to the commencement of work. The obligations of a Contractor/Employer may not be evaded by subcontracting.

3.4 This Agreement shall only be binding on the signatory parties hereto and shall not apply to the parents, affiliates, subsidiaries, or other ventures of any such party. Each Contractor shall alone be liable and responsible for its own individual acts and conduct and for any breach or alleged breach of this Agreement. Any dispute between the Union(s) and the Contractor(s) respecting compliance with the terms of the Agreement shall not affect the rights, liabilities, obligations and duties between the signatory Union(s) and other Contractor(s) party to this Agreement.

3.5 It is mutually agreed by the Parties that any liability by a signatory Union to this Agreement shall be several and not joint. Any alleged breach of this Agreement by a signatory Union shall not affect the rights, liabilities, obligations and duties between the signatory Contractor(s) and the other Union(s) party to this Agreement.

3.6 The provisions of this Agreement, including Schedules A's, which are the local Master Agreements of the Signatory Unions having jurisdiction over the work on the Project, shall apply to the work covered by this Agreement, notwithstanding the provisions of any other local, area and/or national agreements which may conflict with or differ from the terms of this Agreement. Where a subject covered by the provisions of this Agreement is also covered by a Schedule A, the provisions of this Agreement shall prevail. Where a subject is covered by the provisions of a Schedule A and is not covered by this Agreement, the provisions of the Schedule A shall prevail.

ARTICLE 4
WORK STOPPAGES, STRIKES, SYMPATHY STRIKES AND LOCKOUTS

4.1 The Unions, District and Contractor/Employers covered by the Agreement agree that for the duration of the Project:

4.1.1 There shall be no strikes, sympathy strikes, work stoppages, picketing, hand billing or otherwise advising the public that a labor dispute exists, or slowdowns of any kind, for any reason, by the Unions or employees employed on the Project, at the job site of the Project or at any other facility of District because of a dispute on the Project. Disputes arising between the Unions and Contractor/Employers on other District projects are not governed by the terms of the Agreement or this Article.

4.1.2 As to employees employed on the Project, there shall be no lockout of any kind by a Contractor/Employer covered by the Agreement.

4.1.3 If a master collective bargaining agreement between a Contractor/Employer and the Union expires before the Contractor/Employer completes the performance of the Construction Contract and the Union or Contractor/Employer gives notice of demands for a new or modified master collective bargaining agreement, the Union agrees that it will not strike on work covered under this Agreement and the Union and the Contractor/Employer agree that the expired master collective bargaining agreement shall continue in full force and effect for work covered under this Agreement until a new or modified master collective bargaining agreement is reached between the Union and Contractor/Employer. If the new or modified master collective bargaining agreement reached between the Union and Contractor/Employer provides that any terms of the master collective bargaining agreement shall be retroactive, the Contractor/Employer agrees to comply with any retroactive terms of the new or modified master collective bargaining agreement which are applicable to employees who were employed on the projects during the interim with retroactive payment due within seven (7) days of the effective date of the modified Master Agreement.

4.1.4 In the case of nonpayment of wages and trust fund contributions on the Project, the Union shall give the District or its designated agent and the Contractor/Employer(s) five (5) business days' notice when nonpayment of trust funds has occurred and 2 business days' notice when nonpayment of wages has occurred or when paychecks being tendered to a financial institution normally recognized to honor such paychecks will not honor such paycheck as a result of insufficient funds, of the intent to withhold labor from the Contractor/Employer(s)' or their subcontractor's workforce, during which time the Contractor/Employer shall have the opportunity to correct the default. In this instance, a Union's withholding of labor (but not picketing) from an Contractor/Employer who has failed to pay its fringe benefit contributions or failed to meet its weekly payroll shall not be considered a violation of this Article.

4.2 Any party to this Agreement shall institute the following procedure, prior to initiating any other action at law or equity, when a breach of this Article is alleged to have occurred:

4.2.1 A party invoking this procedure shall notify Thomas Angelo, as the permanent arbitrator, or, Robert Hirsch, as the alternate arbitrator under this procedure. In the event that the permanent arbitrator is unavailable at any time, the alternate will be contacted. If neither is available, then a selection shall be made from the list of arbitrators in Article 12. Notice to the arbitrator shall be by the most expeditious

means available, with notices by facsimile or telephone to the District and the party alleged to be in violation and to the Council and involved local Union if a Union is alleged to be in violation.

4.2.2 Upon receipt of said notice, the District will contact the designated arbitrator named above or his alternate who will attempt to convene a hearing within twenty-four (24) hours if it is contended that the violation still exists.

4.2.3 The arbitrator shall notify the parties by facsimile or telephone of the place and time for the hearing. Said hearing shall be completed in one session, which, with appropriate recesses at the arbitrator's discretion, shall not exceed twenty-four (24) hours unless otherwise agreed upon by all parties. A failure of any party to attend said hearings shall not delay the hearing of evidence or the issuance of an award by the arbitrator.

4.2.4 The sole issue at the hearing shall be whether or not a violation of Article IV, Section 4.1 of the Agreement has occurred. The arbitrator shall have no authority to consider any matter of justification, explanation or mitigation of such violation or to award damages, which issue is reserved for court proceedings, if any. The award shall be issued in writing within three (3) hours after the close of the hearing, and may be issued without a written opinion. If any party desires a written opinion, one shall be issued within fifteen (15) days, but its issuance shall not delay compliance with or enforcement of the award. The arbitrator may order cessation of the violation of this Article and other appropriate relief and such award shall be served on all parties by hand or registered mail upon issuance.

4.2.5 Such award may be enforced by any Court of competent jurisdiction upon the filing of this Agreement and all other relevant documents referred to above in the following manner. Written notice of the filing of such enforcement proceedings shall be given to the other party. In the proceeding to obtain a temporary order enforcing the arbitrator's award as issued under Section 4.2(4) of this Article, all parties waive the right to a hearing and agree that such proceedings may be ex parte. Such agreement does not waive any party's right to participate in a hearing for a final order or enforcement. The Court's order or orders enforcing the arbitrator's award shall be served on all parties by hand or delivered by certified mail.

4.2.6 Any rights created by statute or law governing arbitration proceedings inconsistent with the above procedure, or which interfere with compliance, are waived by the parties.

4.2.7 The fees and expenses of the arbitrator shall be divided equally between the party instituting the arbitration proceedings provided in this Article and the party alleged to be in breach of its obligation under this Article.

ARTICLE 5
COORDINATOR AND MEETINGS

5.1 The District shall designate Mike Vlaming as the Coordinator, who shall be responsible for the administration and application of this Agreement. The Coordinator shall endeavor to facilitate harmonious relations between the District, the Contractor/Employers and the Unions signatory hereto. The Coordinator shall not be responsible for the acts of the Contractor/Employers and the Unions signatory hereto, and will not be a party to any arbitration or litigation arising out of this Agreement. The District will pay for the Coordinator. If Mike Vlaming subsequently becomes unable or unwilling to continue to act as Coordinator, the District shall consult with the Council before designating another Coordinator.

5.2 A pre-construction conference shall be held prior to the commencement of work on each phase of the Project to establish the scope of work in each Contractor/Employer's contract. Such conference shall be attended by a representative each from the participating Contractor/Employer(s), including all subcontractors, Union(s) and the Coordinator. The Contractor/Employer performing the work shall have the responsibility for making work assignments pursuant to this Agreement in writing. Any craft objecting to the Contractor/Employer's proposed assignment of work shall have seven (7) working days from the date of the conference to submit written objections to the Contractor/Employer before the Contractor/Employer makes the work assignments final. Should any jurisdictional issue remain in dispute, it shall be subject to the resolution procedure set forth in Article 12. All efforts will be made to properly raise and resolve any issue that may arise out of such meeting, with a goal that such conferences will be held at least 7 days before the work commences. Pre-construction conferences for different Contractor/Employers may be held together.

5.3 There shall be a periodic meeting for the duration of the Project to discuss issues relating to the construction of the Project, including but not limited to discussion of the scheduling and productivity on work performed on the Project. The purpose of these meetings is to promote harmonious relations, ensure adequate communications and advance the efficiency of the Project. The Primary Contractor/Employers shall attend all such meetings.

ARTICLE 6
NO DISCRIMINATION

6.1 The Contractor/Employers and Unions agree to comply with all anti-discrimination provisions of federal, state and local law, to protect employees and applicants for employment, on the Project, including but not limited to protection against discrimination on the basis of race, color, creed, national origin, ancestry, age, sex, sexual orientation, political affiliation, membership in a labor organization, disability or Acquired Immune Deficiency Syndrome or AIDS Related Condition (AIDS/ARC).

ARTICLE 7
UNION SECURITY

7.1 The Contractor/Employers recognize the Union(s) as the sole bargaining representative of all craft employees working within the scope of this Agreement.

7.2 No employee covered by this Agreement is required to join any Union as a condition of being employed on the Project. However, all employees who are employed by Contractor/Employers to work on the Project will be responsible for payment of applicable monthly working dues and any associated fees uniformly required for union membership in the local Union that is a signatory to this Agreement, and shall, on or before 8 days of consecutive or cumulative employment on the Project, tender such dues and fees to the applicable Union.

7.3 Authorized representatives of the Unions shall have access to the Projects whenever work covered by this Agreement is being, has been, or will be performed on the Project.

ARTICLE 8
REFERRAL

8.1. Contractor/Employers performing construction work on the Project described in the Agreement shall, in filling craft job requirements, utilize and be bound by the registration facilities and referral systems established or authorized by the Unions signatory hereto when such procedures are not in violation of Federal law. The Contractor/Employer(s) shall have the right to reject any applicant referred by the Union(s), in accordance with the applicable Master Agreement.

8.2. The Union(s) shall be the sole source of all craft labor employed on the Project. However, in the event that a Contractor(s) has its own core workforce, the Contractor/Employer may request by name, and the Union shall honor, referral of persons who have applied to the local Union for Project work and who demonstrate the following qualifications ("Core Employees"):

a. possess any license and/or certifications required by state or federal law for the Project work to be performed;

b. have worked a total of at least two thousand (2000) hours in the construction craft during the prior two (2) years;

c. were on the Contractor/Employer's active payroll for at least the sixty (60) consecutive calendar business days prior to the contract award;

d. have the ability to perform safely the basic functions of the applicable trade; and

e. live in Solano County or the city of Winters.

8.3. The Union will refer to such Contractor/Employer two journeyman employees from the hiring hall out-of-work list for the affected trade or craft, and will then refer one of such Contractor/Employer's Core Employees as a journeyman and shall repeat the process, one and one, until such Contractor/Employer's crew requirements are met or until Contractor/Employer has hired five (5) Core Employees, whichever occurs first. Thereafter, all additional employees in the affected trade or craft shall be hired exclusively from the hiring hall out-of-work list(s). For the duration of the Contractor/Employer's work the ratio shall be maintained and when the Contractor/Employer's workforce is reduced, employees shall be reduced in reverse order and in the same ratio of core employees to hiring hall referrals as was applied in the initial hiring. Contractor/Employer's signatory to a Local, Regional, and/or National collective bargaining agreements with Union(s) signatory hereto shall be bound to use the hiring hall provisions contained in the Master Collective Bargaining Agreement of the affected Union(s), and nothing in the referral provisions of this Agreement shall be construed to supersede the local hiring hall provisions of the Master Agreement(s) as they relate to such contractors.

8.4. The Contractor(s) shall have the unqualified right to select and hire directly all supervisors above the level of general foreman it considers necessary and desirable, without such persons being referred by the Union(s).

8.5. In the event that referral facilities maintained by the Union(s) are unable to fill the requisition of a Contractor/Employer for employees within a forty-eight (48) hour period (Saturdays, Sundays and Holidays excluded) after such requisition is made by the Contractor/Employer(s), the Contractor/Employer(s) shall be free to obtain workers from any source. A Contractor who hires any personnel to perform covered work on the Project pursuant to this Section shall immediately provide the appropriate Union with the name and address of such employee(s) and shall immediately refer such employee(s) to the appropriate Union to satisfy the requirements of Article VII of this Agreement.

8.6. Unions will exert their utmost efforts to recruit sufficient numbers of skilled craft persons to fulfill the requirements of the Contractor/Employer(s). Recognizing the potential acute shortage of skilled craftspeople, the Unions shall consider a Contractor's request to transfer key employees to work on this Project in a manner consistent with the Union's referral procedures.

ARTICLE 9
BENEFITS

9.1 All Contractor/Employers agree to pay contributions to the established vacation, pension and other form of deferred compensation plan, apprenticeship, and health benefit funds established by the applicable Master Agreement for each hour worked on the Project in the amounts designated in the Master Agreements or Prevailing Wage Determination, whichever is greater, of the appropriate local unions. The Contractor/Employers shall not be required to pay contributions to any other trust funds that are not contained in the published prevailing wage determination to satisfy their obligation under this Article, except that those Contractor/Employers who are signatory

to the Master Agreements with the respective trades shall continue to pay all trust fund contributions as outlined in such Master Agreements.

9.2 By signing this Agreement, the Contractor/Employers adopt and agree to be bound by the written terms of the legally established Trust Agreements, as described in section 9.1, specifying the detailed basis on which payments are to be made into, and benefits paid out of, such Trust Funds.

9.3 Wages, Hours, Terms and Conditions of Employment: The wages, hours and other terms and conditions of employment on the Project shall be governed by the Master Agreement or Prevailing Wage Determination, whichever is greater, of the respective crafts, copies of which shall be on file with the District to the extent such Master Agreement is not inconsistent with this Agreement.

9.4 Holidays: Holidays shall be established as set forth in the applicable Schedule A.

ARTICLE 10
EMPLOYEE GRIEVANCE PROCEDURE

10.1 All disputes involving discipline and/or discharge of employees working on the Project shall be resolved through the grievance and arbitration provision contained in the Master Agreement for the craft of the affected employee. No employee working on the Project shall be disciplined or dismissed without just cause.

ARTICLE 11
COMPLIANCE

11.1 It shall be the responsibility of the Contractor/Employer(s) and Unions to investigate and monitor compliance with the provisions of the Agreement contained in Article 9. Nothing in this Agreement shall be construed to interfere with or supersede the usual and customary legal remedies available to the Unions and/or employee benefit Trust Funds to collect delinquent Trust Fund contributions from Contractor/Employer(s) on the Project. The District shall monitor and enforce compliance with the prevailing wage requirements of the state, and the Contractors/Employers' compliance with this Agreement.

ARTICLE 12
GRIEVANCE ARBITRATION PROCEDURE

12.1 Project Labor Disputes: All Project labor disputes involving the application or interpretation of the Master Collective Bargaining Agreement to which a signatory Contractor/Employer and a signatory Union are parties shall be resolved pursuant to the resolution procedures of the Master Collective Bargaining Agreement. All disputes relating to the interpretation or application of the Agreement shall be subject to resolution by the Grievance arbitration procedures set forth herein.

12.2 No grievance shall be recognized unless the grieving party (Local Union or District Council, on its own behalf, or on behalf of an employee whom it represents, or a Contractor/Employer on its own behalf) provides notice in writing to the signatory party with whom it has a dispute within five (5) days after becoming aware of the dispute but in no event more than thirty (30) days after it reasonably should have become aware of the event giving rise to the dispute. The time limits in Section 12.1 may be extended by mutual written agreement of the parties.

12.3 Grievances shall be settled according to the following procedures:

Step 1: Within five (5) business days after the receipt of the written notice of the grievance, the Business Representative of the involved Local Union or District Council, or his/her designee, or the representative of the employee, and the representative of the involved Contractor/Employer shall confer and attempt to resolve the grievance.

Step 2: In the event that the representatives are unable to resolve the dispute within the five (5) business days after the meeting to resolve the dispute in Step 1, the International Union Representative and the Contractor/Employer involved shall meet within seven (7) working days of the referral of the dispute to this second step to arrive at a satisfactory settlement thereof. Meeting minutes shall be kept by the Contractor. In the event that these representatives are unable to resolve the dispute, either involved party may submit the grievance in writing within five (5) business days to the Business Manager(s) of the affect Union(s) involved, the Manager of Labor Relations of the Contractor/Employer involved or the Manager's designated representative, and the Project Manager for discussion and resolution.

Step 3: If the grievance is not settled in Step 2, either party may request the dispute be submitted to arbitration or the time may be extended by mutual consent of both parties. Within five (5) business days after referral of a dispute to Step 3, the representatives shall choose a mutually agreed upon arbitrator for final and binding arbitration. The parties agree that if the permanent arbitrator or his alternate is not available, an arbitrator shall be selected by the alternate striking method from the list of five (5) below. The order of striking names from the list of arbitrators shall be determined by a coin toss, the winner of which shall decide whether they wish to strike first or second.

1. William Riker
2. Barry Winogard
3. Thomas Angelo
4. Robert Hirsch
5. Jeri-Lou Cossack

12.4 The decision of the Arbitrator shall be binding on all parties. The Arbitrator shall have no authority to change, amend, add to or detract from any of the

provisions of the Agreement. The expense of the Arbitrator shall be borne equally by both parties. The Arbitrator shall arrange for a hearing on the earliest available date from the date of his/her selection. A decision shall be given to the parties within five (5) calendar days after completion of the hearing unless such time is extended by mutual agreement. A written opinion may be requested by a party from the presiding arbitrator.

12.5 The time limits specified in any step of the Grievance Procedure set forth in Section 12.2 may be extended by mutual agreement of the parties initiated by the written request of one party to the other, at the appropriate step of the Grievance Procedure. However, failure to process a grievance, or failure to respond in writing within the time limits provided above, without an agreed upon extension of time, shall be deemed a waiver of such grievance without prejudice, or without precedent to the processing of and/or resolution of like or similar grievances or disputes.

12.6 In order to encourage the resolution of disputes and grievances at Steps 1 and 2 of this Grievance Procedure, the parties agree that such settlements shall not be precedent setting.

ARTICLE 13
WORK ASSIGNMENTS AND JURISDICTIONAL DISPUTES

13.1 The assignment of Covered Work will be solely the responsibility of the Employer performing the work involved; and such work assignments will be in accordance with the Plan for the Settlement of the Jurisdictional Disputes in the Construction Industry (the "Plan") or any successor Plan.

13.2 All jurisdictional disputes on this Project between or among the building and construction trades Unions and the Employers parties to this Agreement, shall be settled and adjusted according to the present Plan established by the Building and Construction Trades Department or any other plan or method of procedure that may be adopted in the future by the Building and Construction Trades Department. Decisions rendered shall be final, binding and conclusive on the Employers and Unions parties to this Agreement.

13.3 For the convenience of the parties, and in recognition of the expense of travel between Northern California and Washington, DC, at the request of any party to a jurisdictional dispute under this Agreement an Arbitrator shall be chosen by the procedures specified in Article V, Section 5, of the Plan from a list composed of John Kagel, Thomas Angelo, Robert Hirsch, and Thomas Pagan, and the Arbitrator's hearing on the dispute shall be held at the offices of the Napa-Solano Building & Construction Trades Council. All other procedures shall be as specified in the Plan.

13.4 All jurisdictional disputes shall be resolved without the occurrence of any strike, work stoppage, or slow-down of any nature, and the Employer's assignment shall be adhered to until the dispute is resolved. Individual employees violating this section shall be subject to immediate discharge. Each Employer will conduct a pre-job conference with the Council prior to commencing work. The Project Manager and the

District will be advised in advance of all such conferences. The Primary Contractor shall attend all such meetings and the District and may participate if it wishes. Pre-job conferences for different Employers may be held together.

ARTICLE 14
APPRENTICES

14.1 Recognizing the need to develop adequate numbers of competent workers in the construction industry, the Contractor/Employer(s) shall employ apprentices from California State-approved Joint Apprenticeship Programs in the respective crafts to perform such work as is within their capabilities and which is customarily performed by the craft in which they are indentured.

14.2 The apprentice ratios will be in compliance with the applicable provisions of the California Labor Code and Prevailing Wage Rate Determination.

14.3 There shall be no restrictions on the utilization of apprentices in performing the work of their craft provided they are properly supervised, except as provided by law and the provisions herein.

14.4 The Parties recognize the importance to the Solano Community College District Board of Trustees of providing Solano Community College students and graduates with the opportunity to participate both in the Unions' Apprenticeship Programs and the opportunity to work on the Project(s) under this Agreement. To the extent permitted by law and the hiring hall provisions of the applicable local Union and the rules and bylaws of the applicable joint apprenticeship program and in compliance with the Program's Standards approved by the State of California, Division of Apprenticeship Standards:

14.4.1 The Union apprenticeship programs will provide for direct entry of qualified graduates of local and approved pre-apprenticeship programs upon request from a signatory Contractor/Employer seeking to fulfill local hiring goals specified under this Agreement. The pre-apprentice programs covered under this provision include but are not limited to the pre-apprenticeship bridge programs that will be developed at Solano Community College in partnership with local trades, per Addendum B.

14.4.2 Each Contractor/Subcontractor performing work covered by this Agreement shall employ on the Project, if available, at least one eligible Solano Community College student or graduate who is enrolled and participating in a Joint Apprenticeship Program approved by the State of California, Division of Apprenticeship Standards, for any craft for which such program exists, when the Contractor/Employer has the minimum number of employees as is established by the Department of Apprenticeship Standards regulations for the employment of apprentices. A properly indentured apprentice must be employed under the regulations of the craft or trade at which s/he is indentured and shall be employed only for work of the craft or trade in which s/he is registered. If an apprentice is

not available for referral to a Contractor/Employer when such Contractor/Employer is required to employ an apprentice pursuant to this subsection, the Contractor/Employer shall maintain an open request for such referral, should an opening occur at a later date, as long as its obligations to employ the apprentice exists.

ARTICLE 15
LOCAL HIRE

The Parties to this Agreement support the development of increased numbers of skilled construction workers from graduates of District schools and residents of Solano County and the City of Winters to meet the needs of District Projects and the requirements of the industry generally. Toward that end, the Unions agree to encourage the referral and utilization, to the extent permitted by law and the hiring hall procedures, of qualified graduates of District schools, Solano County residents, and residents of the City of Winters as journeymen and apprentices to covered Projects and entrance into such apprenticeship and training programs as may be operated by the Unions. In addition, all efforts will be made for the workforce to represent the ethnic make up of Solano County and the City of Winters.

ARTICLE 16
MANAGEMENT RIGHTS

16.1 The Contractor/Employer(s) shall retain full and exclusive authority for the management of their operations, including the right to direct their work force in their sole discretion. No rules, customs or practices shall be permitted or observed which limit or restrict production, or limit or restrict the working efforts of employees except that lawful manning provisions in the Master Agreement shall be recognized.

ARTICLE 17
HELMETS TO HARDHATS

17.1 The Contractor/Employers and the Unions recognize a desire to facilitate the entry into the building and construction trades of veterans who are interested in careers in the building and construction industry. The Contractor/Employers and Unions agree to utilize the services of the Center for Military Recruitment, Assessment and Veterans Employment (hereinafter "Center) and the Center's "Helmets to Hardhats" program to serve as a resource for preliminary orientation, assessment of construction aptitude, referral to apprenticeship programs or hiring halls, counseling and mentoring, support network, employment opportunities and other needs as identified by the parties.

17.2 The Unions and Contractor/Employers agree to coordinate with the Center to create and maintain an integrated database of veterans interested in working on the Project and of apprenticeship and employment opportunities for this Project. To the extent permitted by law, the Unions will give credit to such veterans for bona fide, provable past experience.

ARTICLE 18
DRUG & ALCOHOL TESTING

18.1 The use, sale, transfer, purchase and/or possession of a controlled substance, alcohol and/or firearms at any time during the work day is prohibited.

18.2 Drug and alcohol testing shall be conducted in accordance with the Substance Abuse Prevention Policies set forth in each applicable Schedule A.

ARTICLE 19
SAVINGS CLAUSE

19.1 The Parties agree that in the event any article, provision, clause, sentence or word of the Agreement is determined to be illegal or void as being in contravention of any applicable law, by a court of competent jurisdiction, the remainder of the Agreement shall remain in full force and effect. The Parties further agree that if any article, provision, clause, sentence or word of the Agreement is determined to be illegal or void, by a court of competent jurisdiction, the Parties shall substitute, by mutual agreement, in its place and stead, an article, provision, clause, sentence or word which will meet the objections to its validity and which will be in accordance with the intent and purpose of the article, provision, clause, sentence or word in question.

19.2 The Parties also agree that in the event that a decision of a court of competent jurisdiction materially alters the terms of the Agreement such that the intent of the parties is defeated, then the entire Agreement shall be null and void.

19.3 If a court of competent jurisdiction determines that all or part of the Agreement is invalid and/or enjoins the District from complying with all or part of its provisions and the District accordingly determines that the Agreement will not be required as part of an award to a Contractor/Employer, the Unions will no longer be bound by the provisions of Article 4.

ARTICLE 20
TERM

20.1 The Agreement shall be included in the Bid Documents as a condition of the award of all construction contracts for the Project.

20.2 The Agreement shall continue in full force and effective until the completion of the Project.

ARTICLE 21
MISCELLANEOUS PROVISIONS

21.1 Counterparts: This Agreement may be executed in counterparts, such that original signatures may appear on separate pages, and when bound together all necessary signatures shall constitute an original. Facsimile and electronic signature pages

transmitted to other parties to this Agreement shall be deemed equivalent to an original signature.

21.2 Warranty of Authority: Each of the persons signing this Agreement represents and warrants that such person has been duly authorized to sign this Agreement on behalf of the party indicated, and each of the parties by signing this Agreement warrants and represents that such party is legally authorized and entitled to enter into this Agreement.

21.3 Ratification by Governing Board: This Agreement shall not be binding on the District until it is approved by the Governing Board of the Solano Community College District.

SOLANO COMMUNITY COLLEGE DISTRICT

By: _____ Date: 12-09-13

NAPA-SOLANO BUILDING & CONSTRUCTION TRADES COUNCIL

By: _____ Date: _____
Ben Espinoza, President

SIGNATURE BLOCKS FOR UNIONS

Asbestos Workers Local #16

By: _____

Bricklayers & Allied Trades Crafts Local #3

By: _____

Boilermakers Local #549

By: _____

Carpenters 46 Northern California Counties Conference Board

By: _____

District Council of Cement Masons and Plasterers Local #400

By: _____

District Council of Cement Masons and Plasterers Local #300

By: _____

District Council #16 Int'l Union of Painters and Allied Trades

By: _____

Electrical Workers Local #180

By: _____

Iron Workers Local #378

By: _____

Northern California District Council of Laborers

By: _____

Operating Engineers Local #3

By: _____

Plumbers & Steamfitters Local #343

By: _____

Roofers & Waterproofers Local #81

By: _____

Sheetmetal Workers Local #104

By: _____

Sprinklerfitters Local #483

By: _____

Utility/Landscape Local #355

By: _____

Teamsters Local #315

By: _____

Elevator Constructors Local #8

By: _____

ADDENDUM A:

AGREED TO LETTER OF ASSENT

Mr. Lucky Lofton

Executive Bonds Manager

Solano Community College District

4000 Suisun Valley Road

Fairfield CA, 94534

Re: Solano Community College Measure Q Project Labor Agreement

Mr. Lucky Lofton,

The undersigned party confirms that it agrees to be a party to and bound by the Solano Community College District Measure Q Construction Project, Project Labor Agreement as such Agreement may, from time to time, be amended by the parties or interpreted pursuant to its terms.

By executing this Letter of Assent, the undersigned party subscribes to, adopts and agrees to be bound by the written terms of the legally established trust agreements specifying the detailed basis upon which contributions are to be made into, and benefits made out of, such trust funds and ratifies and accepts the trustees appointed by the parties to such trust funds.

Such obligation to be a party to and bound by this Agreement shall extend to all work covered by said Agreement undertaken by the undersigned party on the [Measure Q Construction Project. The undersigned party shall require all of its subcontractors, of whatever tier, to become similarly bound for all their work within the scope of this Agreement by signing an identical Letter of Assent.

This letter shall constitute a subscription agreement, to the extent of the terms of the letter.

CONTRACTOR/ SUBCONTRACTOR _____

Project Contract Number _____

California State License Number:
Or Motor Carrier (CA) Permit Number _____

Name and Signature of Authorized Person: _____
(Print Name)

_____
(Title)

_____
(Signature) (Date)

ADDENDUM B:

MEMORANDUM OF UNDERSTANDING
SOLANO COMMUNITY COLLEGE DISTRICT MEASURE Q
PROJECT LABOR AGREEMENT

The parties to this Agreement agree to establish a committee to develop a Construction Career Pathway Partnership ("Partnership") to identify educational and employment opportunities for District students in the construction industry and to actively and regularly engage in exploring the possibility of long-term collaboration on implementing partnership opportunities for apprenticeship training. The committee shall include representatives of the District, Unions and Contractors signatory to this Agreement. Further, as part of this Partnership, the parties agree to mutually support and participate in a one day "Construction Awareness Day" event on each Project covered under this Agreement at a time in which there is active construction on the Project with the purpose of increasing the awareness for students and residents of the District regarding potential careers in the construction industry. Craft workers will be compensated for the time necessary to sufficiently clean the work site to accommodate each one-day event. Those craft workers involved in the skill demonstrations during each one-day event will participate on a voluntary basis.

SOLANO COMMUNITY COLLEGE DISTRICT	NAPA-SOLANO BUILDING & CONSTRUCTION TRADES COUNCIL
	Ben Espinoza, President
Date 12-09-13	Date

END OF DOCUMENT

IRAN CONTRACTING ACT CERTIFICATION
(Public Contract Code Sections 2202-2208)

PROJECT/CONTRACT NO.: **Substation 3 & 4 Replacement / 23-001** between the **Solano Community College District** ("District") and _____ _____ ("Contractor" or "Bidder") ("Contract" or "Project").

Prior to bidding on or submitting a proposal for a contract for goods or services of $1,000,000 or more, the bidder/proposer must submit this certification pursuant to Public Contract Code section 2204.

The bidder/proposer must complete **ONLY ONE** of the following two options. To complete OPTION 1, check the corresponding box **and** complete the certification below. To complete OPTION 2, check the corresponding box, complete the certification below, and attach documentation demonstrating the exemption approval.

- ☐ **OPTION 1**. Bidder/Proposer is not on the current list of persons engaged in investment activities in Iran created by the California Department of General Services ("DGS") pursuant to Public Contract Code section 2203(b), and we are not a financial institution extending twenty million dollars ($20,000,000) or more in credit to another person, for 45 days or more, if that other person will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS.

- ☐ **OPTION 2**. Bidder/Proposer has received a written exemption from the certification requirement pursuant to Public Contract Code sections 2203(c) and (d). *A copy of the written documentation demonstrating the exemption approval is included with our bid/proposal*.

CERTIFICATION:

I, the official named below, CERTIFY UNDER PENALTY OF PERJURY, that I am duly authorized to legally bind the bidder/proposer to the OPTION selected above. This certification is made under the laws of the State of California.

Vendor Name/Financial Institution (Printed)	*Federal ID Number (or n/a)*
By (Authorized Signature)	
Printed Name and Title of Person Signing	*Date Executed*

END OF DOCUMENT