PROJECT MANUAL

GRANITE HILLS MIDDLE SCHOOL EXPANSION (PH. 1)
SITE WORK FOR TEMPORARY HOUSING
A04-125701

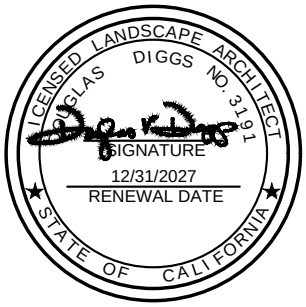
ROMOLAND SCHOOL DISTRICT

PJHM architects

GRANITE HILLS MIDDLE SCHOOL EXPANSION (PH. 1)
SITE WORK FOR TEMPORARY HOUSING
ROMOLAND SCHOOL DISTRICT



CIVIL



LANDSCAPE

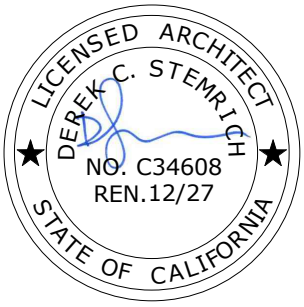


STRUCTURAL



ELECTRICAL

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 04-125701 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 10/28/2026



ARCHITECT

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END OF SECTION

SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  - 1. Payment Procedures
  - 2. Schedule of Values
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS

1.05 SUBMITTALS
- A. Product Data
- B. Shop Drawings
- C. Samples
- D. Quality Assurance/Control Submittals
  - 1. Schedule of Values
    - a. Submit a Preliminary (Pencil Draft) Schedule of Values to the ARCHITECT and OWNER for review and approval within 15 calendar days after the date of OWNER issued Notice to Procceed (N.T.P.)
    - b. Submit in PDF format, using either AIA G703 Continuation Sheet or ConsensusDocs 239:Schedule of Values.
      1. Schedule of Values shall include all trades, General Conditions/Requirements, General Contractor's Overhead and Profit, and bonds and insurance for each site.
    - c. Submit a Final Schedule of Values to the ARCHITECT and OWNER for review and approval prior to submittal of first application for payment.

d. In the Schedule of Values, the Contract Sum shall be broken down into specific elements of the Work, and as follows, coded in accordance with the OWNER'S coding structure.
    1. Project Information
        a. Project Name
        b. Project Number
        c. Project Address
        d. Contractor Contact
    2. Item Numbers
        a. Each line assigned a item number
        b. Item numbers represent specific work activity or task involved in project.
        c. Line items shall numbered sequentially and assigned a corresponding description that clearly identifies the scope of work.
    3. Description of Work
        a. Provide a detailed description of work to be performed.
    4. Scheduled Value
        a. Provide the associated cost of each work item or task.
        b. The total amount represents the payment amount due to the Contractor upon completion.
        c. The total amount also represents the credit amount due to the Owner is work is descoped from the project.
    5. Work Completed
    6. Stored Materials
    7. Total Completed plus Stored-to-Date
    8. Percent Complete
    9. Balance to Finish
    10. Retainage
    11. Total Cost
e. On projects of more than one building, provide separate schedules for each building.
f. The Percent Complete values from the approved Construction Progress Schedule shall provide the basis for each Application for Payment. Before each Application, update the progress schedule with all approved Change Orders.

2. Application For Payment
    a. Payment Application Forms: Use OWNER provided forms for the Application for Payment.
    b. Submit Application for Payment to the ARCHITECT. It shall include the updated Schedule of Values and Construction Progress Schedule, releases and similar attachments.
    c. The Project Inspection shall review all Applications for Payment prior to submittal to the Architect.
    d. The Architect shall review all Applications for Payment prior to submittal to the Owner.

e. Each certified Application for Payment shall be consistent with previous applications and payments as reviewed by ARCHITECT and paid for by OWNER.

f. Payment Application Times: The period of Work covered by each Application for Payment is based on the payment date for each progress payment as specified in the General Conditions. The period covered by each Application for Payment is the previous month.

g. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with the first certified Application for Payment include, but are not limited to, the following:
   1. Approved Schedule of Values.
   2. Performance and payment bonds
   3. List of principal suppliers and fabricators
   4. Worker Compensation certificates
   5. Auto Insurance
   6. Hazardous Material Insurance Certificates
   7. Construction Progress Schedule
   8. Submittal Schedule
   9. Emergency Contact List
   10. Copies of authorizations and licenses from governing authorities for performance of the Work

h. Application for Payment at Substantial Completion: Following OWNER issuance of the certificate of Substantial Completion, submit an Application for Payment together with the following:
   1. Occupancy permits and similar approvals by authorities having legal jurisdiction over the Work
   2. Removal of temporary facilities and services
   3. Testing, adjusting and balance records
   4. Removal of surplus materials, rubbish, and similar elements
   5. Meter readings
   6. Start-up performance reports
   7. OWNER training and orientations
   8. Change-over information related to OWNER occupancy, use, operation, and maintenance
   9. Final cleaning
   10. Ensure that incomplete Work is not accepted and will be completed without undue delay
   11. Advice on shifting insurance coverage
   12. List of defective Work, recognized as exceptions to certificate of Substantial Completion
   13. Change of door locks to OWNER system

i. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include, but are not limited to, the following:
   1. Completion of Contract Closeout requirements
   2. Project record and other closeout documents

3. Completion of final punch list items
4. Delivery of extra materials, products and or stock
5. Identification of unsettled claims
6. Proof that taxes, fees, and similar obligations are paid
7. Evidence of payment and release of liens
8. Operating and maintenance instruction manuals
9. Consent of surety to final payment
10. Waivers and releases
11. Warranties, guarantees and maintenance agreements

j. Retention
1. Retention will be released no sooner than 35 days and not later than 60 days after Notice of Completion has been recorded with the County Recorder's Office.

E. Closeout Submittals

1.06 QUALITY ASSURANCE
1.07 DELIVERY, STORAGE, AND HANDLING
1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01 25 00
SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  1. Provide, install, and finish of products specified under options and conditions for substitutions stated in this section of specifications and as needed for a complete, proper, and operable installation.
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS
- A. Products List
  1. Submit complete list of major products and systems which are proposed for installation. Include Substitution Request Form attached to the end of this specification. Digital submissions REQUIRED.
  2. Tabulate products and systems by specifications section number and title.
  3. For products and systems specified only by reference standards, list for each such product or system:
     a. Name and address of manufacturer or fabricator.
     b. Trade name.
     c. Model or catalog designation, including date.
     d. Manufacturer's or fabricator's data and literature on: Reference standards, performance test data, certifications.
- B. Specified Options
  1. For products specified only by reference standard, select product meeting that standard, by any manufacturer.
  2. For products specified by naming several products or manufacturers, select any one (1) of the products or manufacturers named.
  3. For products specified by naming one (1) or more products or manufacturers and stating "or equal", submit a request for substitutions for any product or manufacturer which is not specifically named, but only after submitting bid on specified products and systems.

C. Submission of Data Substantiating a Request for a Substitution of "An Equal Item"

1. A substitution request must be submitted to the OWNER not later than seven (7) days prior to the Bid Deadline specified in the Notice Inviting Bids. The OWNER will not consider any substitution request received thereafter, except to the extent provided in the General Conditions. Concurrently with submitting a substitution request, the Bidder must provide all information required pursuant to the General Conditions to substantiate the request. The OWNER shall not be required to make a determination in regard to any substitution request and/or substantiating information prior to award of the Contract. If the OWNER gives a Notice of Award for the Contract to a Bidder, but subsequently disapproves a substitution proposed by that Bidder, the Bidder must provide the Specified Item in accordance with the Contract Documents and at no additional cost to the OWNER.
2. It is the intent of the OWNER and ARCHITECT to have this project constructed with materials, products and systems originally designed and specified into project. This opportunity to request substitutions is not for the convenience of bidders or CONTRACTORS to submit bids for materials, products and systems which may be more familiar to them, or having a lesser cost.
3. Submit separate request for each substitution item. Support each request with an explanation for the request, and include:
    a. Complete data substantiating compliance of proposed substitutions with requirements stated in contract documents:
        1. Product identification, including manufacturer's name and address.
        2. Manufacturer's literature; identify: Product description, reference standards, performance and test data.
        3. Samples, as applicable.
        4. Name and address of similar projects on which product has been used, and date of each installation, as well as servicing agency and installer.
    b. Itemized comparison of the proposed substitution with products specified, listing significant variations.
    c. Data relating to changes in the construction schedule.
    d. Any effect of substitution on separate contracts.
    e. Any effect of substitution on in-place construction or other materials and systems to be installed.
    f. Accurate cost data comparing proposed substitution with product specified.
    g. Designation of required license fees or royalties.
    h. Designation of availability of maintenance services and sources of replacement materials.
4. Substitutions will not be considered for acceptance when:
    a. Lesser material cost is the sole reason for request.

b. They are indicated or implied on shop drawings or product data submittals without formal request.
c. Acceptance may require revision of contract documents.

5. Substitute products shall not be ordered or installed without written acceptance and authorization of OWNER and ARCHITECT.
6. Substitutions shall be approved by OWNER and ARCHITECT prior to fabrication or use.
7. Only the OWNER and ARCHITECT will determine the acceptability of proposed substitutions.

D. Representations

1. In making a legitimate, authorized formal request for substitution, represent that:
   a. A thorough investigation has transpired concerning the proposed product, and it has been determined that it is equal to or superior in all respects to that specified.
   b. The same warranties or bonds and guarantees will be provided as for that specified.
   c. Installation of the accepted substitution will be coordinated into the work; and such changes to in-place work, ordered materials and products, or other work to be in progress prior to installation of the requested substitutions, will be performed without any additional cost to OWNER.

E. Duties

1. Requests for substitutions must be expeditiously forwarded for consideration per the requirements of the General Conditions.
2. Notification of decisions concerning acceptance or rejection will be in writing, and are final without need for clarification.

1.05 SUBMITTALS
1.06 QUALITY ASSURANCE
1.07 DELIVERY, STORAGE, AND HANDLING
1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

NOT APPLICABLE

SUBSTITUTION REQUEST FORM

Date: _____

Attn: _____

PJHM Architects, Inc.
25550 Commercentre, Suite 175
Lake Forest, CA 92630

Architect's Project No.: _____

Project: _____

Permit/Application No.: _____

The undersigned requests consideration of the following substitution:

Specified Item: _____

(Drawing Sheet/Detail No., Specification Section, Description, etc.)

_____

_____

_____

_____

Proposed Substitution:

_____

_____

_____

_____

Statement of Cause:

_____

_____

_____

_____

Special Note: Modifications to any language contained in this document is unacceptable. If modifications are made, the entire substitution package will be returned without review.

We have attached the following submittal checklist for your use, verify all items are included with your substitution request submittal.

- ❑ Substitution request has been submitted not later than seven (7) days prior to the bid deadline specified in the Notice Inviting Bids.

  Notice Inviting Bids Date:_____Substitution Request Date:_____

- ❑ Product description, specifications, drawings, photographs, performance and test data adequate for evaluation of the requests with applicable portions of the data clearly identified, manufacturer's literature, samples, names and address of the manufacturer's representative have all been provided.

- ❑ Complete documentation of all regulatory approvals required by the Contract Documents for the proposed substitution.

- ❑ Itemized comparison/analysis of proposed substitution with that of the specified product.

- ❑ Detailed cost summary of the change, if any, to the Contract Sum.

- ❑ Evaluation of the effect of the proposed substitution on the construction schedule and impact on completion date.

- ❑ Description of changes to the Contract Documents which proposed substitution will require for its proper installation.

- ❑ Manufacturer's Warranty comparison between the specified manufacturer and the proposed manufacturer.

The undersigned states that the following paragraphs, unless modified on the attachments, are correct:

A. The proposed substitution does not affect dimensions shown on the Drawings.

B. The undersigned will pay all costs for changes to the building design, including engineering design, detailing and construction costs, and LAHJ review/approval fees caused by the requested substitution.

C. The proposed substitution will have no adverse affect on other trades or specified warranty requirements.

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

The undersigned further states that the function, appearance and quality of the proposed substitution are equivalent or superior to the specified item.

Submitted By:

Name: _____ Signature: _____

Firm/Company: _____

Address: _____

Telephone: _____ Date: _____

Approved by (ARCHITECT):

Approved by (OWNER):

Name: _____ Name: _____

Signature: _____ Signature: _____

Date: _____ Date: _____

(ARCHITECT to include submittal approval stamp)

END OF SECTION

SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  1. Coordination.
  2. Field engineering.
  3. Pre-construction conference.
  4. Progress meetings.
  5. Pre-installation conferences.
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS
- A. Coordination
  1. Coordinate scheduling, submittals, and work of the various sections of the specifications to assure efficient and orderly sequence of installation of interdependent construction elements with provisions for accommodating items installed later.
  2. Prior to commencement of a particular type or kind of work, examine relevant information, Contract Documents and subsequent data issued to the project.
  3. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to and placing in service, such equipment.
  4. Coordinate space requirements and installation of mechanical and electrical work, which are indicated diagrammatically on drawings. Follow routing shown for pipes, ducts and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance and for repairs.
  5. In finished areas, except as otherwise indicated, conceal pipes, ducts and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
  6. In locations where several elements of mechanical and electrical work must be sequenced and positioned with precision in order to fit into available space, prepare coordination drawings showing the actual conditions required for the installation. Prepare coordination drawings prior to purchasing, fabricating or installing of the elements required to be coordinated.

7. Closing up of walls, roofs, concealed spaces, partitions, or furred spaces, backfilling and other covering up operations shall not proceed until all enclosed or covered work and inspections have been completed. Verify before proceeding.
8. Coordinate completion and clean up of work of separate sections in preparation for substantial completion (and for portions of work designated for OWNER'S full and/or partial occupancy).
9. After OWNER'S occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents to minimize disruption of OWNER'S activities.
10. Coordinate all utility company work in accordance with the General Conditions.

B. Field Engineering (If applicable to project scope)
1. CONTRACTOR shall employ a Land Surveyor, registered in the State of California and acceptable to the ARCHITECT.
2. Control datum for survey is that established by OWNER provided survey. CONTRACTOR is to locate and protect survey control and reference points.

C. Pre-Construction Conference
1. OWNER shall schedule a conference immediately after receipt of fully executed Contract Documents prior to project mobilization.
2. Mandatory Attendance: OWNER, ARCHITECT, CONTRACTORS and CONTRACTOR'S Job Superintendent.
3. Optional Attendance: ARCHITECT'S consultants, subcontractors and utility company representatives.
4. OWNER will preside at conference. ARCHITECT shall record meeting minutes and distribute copies through the OWNER.
5. Agenda:
    a. Execution of OWNER-CONTRACTOR Agreement.
    b. Issue Notice to Proceed.
    c. Submission of executed bonds and insurance certificates.
    d. Distribution of Contract Documents.
    e. Submission of list of subcontractors, list of products, schedule of values, project schedule, and submittal schedule.
    f. Designation of responsible personnel representing the parties.
    g. Procedures and processing of field decision, submittals, substitutions, applications for payments, proposal request, change orders and contract closeout procedures.
    h. Scheduling.

D. Job Start Meeting
1. After the OWNER awards the contract, and prior to the commencement of the work, a mandatory Job Start meeting (Pre-Job conference) shall be conducted by the OWNER with the CONTRACTOR and those subcontractors listed in its bid documents.

E. Progress Meetings
1. ARCHITECT will schedule and administer meetings throughout progress of the work at bi-monthly (Every two weeks) intervals or more frequently if needed.

2. ARCHITECT will make arrangements for meetings, prepare agenda and preside at meetings. ARCHITECT will record minutes (Field Reports) and distribute copies.
3. Attendance required: OWNER, ARCHITECT, and CONTRACTOR. CONTRACTOR'S attendance is mandatory.
4. Minimum Agenda Items
    a. Review minutes of previous meetings (Field Reports).
    b. Review work progress.
    c. Field observations, problems, and decisions.
    d. Identification of problems which impede planned progress.
    e. Review of submittals, schedule, and status of submittals.
    f. Review of off-site fabrication and delivery schedules.
    g. Maintenance of progress schedule.
    h. Corrective measures to regain projected schedules.
    i. Planned progress during succeeding work period.
    j. Coordination of projected progress.
    k. Maintenance of quality and work standards.
    l. Effect of proposed changes on progress schedule and coordination.
    m. Other business relating to work.

F. Pre-Installation Conference
1. When required in individual specification sections, convene a pre-installation conference prior to commencing work of the section.
2. Require attendance of parties directly affecting, or affected by, work of the specific section.
3. Notify ARCHITECT through OWNER at least five (5) days in advance of meeting date.
4. CONTRACTOR shall prepare agenda, preside at conference, record minutes and distribute copies within two (2) days after conference to participants
5. Review conditions of installation, preparation and installation procedures and coordination with related work.

1.05 SUBMITTALS
1.06 QUALITY ASSURANCE
1.07 DELIVERY, STORAGE, AND HANDLING
1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
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1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01 32 16
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  - 1. Construction Progress Schedule Procedures
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS

1.05 SUBMITTALS
- A. Schedule Submittals
  - 1. CONTRACTOR shall submit Construction Progress Schedules as follows:
    - a. Preliminary Schedule: Submit a preliminary Baseline Schedule within fourteen days after Notice of Award. OWNER will review the Preliminary Schedule and return comments within ten workdays.
    - b. Initial Schedule: Revise the preliminary Schedule and resubmit within ten days, to provide the Project's Baseline Schedule.
    - c. Weekly Schedule Update: While retaining the Baseline Schedule, revise copies to show actual construction progress to date, and submit at scheduled weekly dates, or as otherwise required by the OWNER.
    - d. In the event that the progress of the Work or the sequencing of the activities of the Work differs significantly from that indicated in the Baseline Schedule, the Contractor shall submit a Recovery Schedule to the OWNER, demonstrating the CONTRACTOR'S plan to recover lost time, achieve all contractual milestones, and complete the work within the contract time. Appropriate recovery actions include, but are not limited to, assignments of additional labor or equipment, shift or overtime work, expediting of submittals or deliveries, overlapping of activities, or sequencing changes to increase activity concurrence. An accompanying narrative shall describe the cause of the problems and the actions planned by the Contractor to recover the schedule. The OWNER will review the Recovery Schedule and provide comments, leading to approval of the schedule.
    - e. With each Application for Payment.

1.06 QUALITY ASSURANCE
1.07 DELIVERY, STORAGE, AND HANDLING
1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING

A. Form and Content of Schedules

1. Schedule shall be in the form of a computer-generated Critical Path Method (CPM) or Gantt format showing all construction activities required to complete the Work of the Project within the Contract Time and any OWNER-defined Milestones.
2. CONTRACTOR shall utilize an established standard, centralized, Internet-based scheduling program.
3. Schedule shall include but not be limited to the following:
    a. Complete sequence, with start and completion dates, of each and every activity of construction or element of the construction process.
    b. Phases of construction, with start and completion Milestones, as well as any other Milestones defined by the OWNER.
    c. Critical submittals, including OWNER and ARCHITECT review and approval periods, including 15 workdays for the first submittal (10 days for resubmittal), 21 days when the ARCHITECT'S consultants must review, and 30 days for review of submittals of Structural Steel, Door Hardware, and Hollow Metal Doors and Frames.
    d. Procurement, manufacture and/or fabrication; testing and delivery to the Project site of special long-lead-time material and equipment.
    e. Operational start-up, test and balance, performance testing, and training of operators for systems and equipment; for Substantial Completion and for Final Completion.
    f. Temporary facilities; construction of mock-ups, prototypes and/or samples; punch list; interfaces with Separate Work Contracts; and regulatory agency approvals and permits required for performance of the Work.
    g. Deferred Approvals, allowing a minimum of ninety (90) days for all Deferred Approval items.
    h. OWNER interfaces and Owner-Furnished equipment, either installed by CONTRACTOR (O.F.C.I.) or by OWNER (O.F.O.I.).
    i. Decision dates for products specified by allowances, selection of finishes, and other ARCHITECT- or OWNER-furnished schedules or decisions.
4. Schedule shall be updated periodically as specified to show progress of each activity and all changes since the previous submission, including:
    a. Major changes in scope.
    b. Activities modified since previous updating.

c. Revised projections due to changes.
d. Other identifiable changes.

B. Schedule Requirements
1. Schedule shall represent CONTRACTOR'S plan to complete the Work within the Milestones and/or Contract Time. However:
a. A schedule extending beyond the Milestones and/or Contract Time will not be acceptable.
b. A schedule indicating Work completed in less than the Milestones and/or Contract Time will not be acceptable. CONTRACTOR shall indicate any available float.
c. A schedule found unacceptable by the OWNER shall be revised by CONTRACTOR and resubmitted within five (5) days.
2. Schedule shall be in sufficient detail to assure adequate planning and execution of Work, including but not limited to:
a. Start and completion of all items of Work and their major components, and all designated dates identified as Milestones by OWNER.
b. Construction activity durations shall be limited to no more than two reporting periods, with exception of fabrication and procurement activities, unless approved otherwise by OWNER. Activity durations shall be total of actual workdays to perform and complete that activity and shall not include consideration of weather impact on the activity.
c. Activities for procurement, delivery, and installation of equipment, materials and other supplies, including time for submittals, reviews and re-submittals. Include decision dates for selection of finishes.
d. Time for fabrication and delivery of manufactured products for the Work, showing interdependence of procurement and construction activities.
e. Identify each activity with applicable CSI Specification Division number, and coordinate with the CONTRACTOR'S approved "Schedule of Values." Include adequate breakdown of activities for the Mechanical and Electrical elements of the work, to enable accurate monitoring and to assure full coordination with OWNER'S operating personnel.
f. Each activity shall be capable of being cost and resource-loaded with the resulting cost total equal to the Contract Amount
g. Activities shall include all associated interface activities contained within the Contract Documents including, but not limited to, OWNER maintenance-and-operations activities
h. Each activity shall be defined to permit reasonable monitoring and evaluation of progress in performance of the Work.
3. Notwithstanding acceptance of the Schedule, failure to identify and/or include any element of the Contract into the Schedule shall not release CONTRACTOR from obligation of completing all required

Work in accordance with the Contract Completion Date or any Milestones.

4. Submittal of the Schedule shall constitute CONTRACTOR'S confirmation that the Schedule meets the requirements of the Contract Documents, and the Work will be executed in the sequence indicated in the Schedule.
5. If CONTRACTOR fails to comply with the specified requirements, OWNER reserves the right to engage an independent scheduling consultant and/or provide its own expertise to fulfill these requirements and shall be entitled to recover by assessment all incurred costs for the services from the CONTRACTOR.
6. Submittal of any Schedule is subject to review and acceptance by ARCHITECT and OWNER. OWNER retains the right to withhold progress payments in whole or part until CONTRACTOR submits a Schedule acceptable to OWNER.

1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  1. Submittal General Procedures and Minimum Requirements
  2. Submittal Documents

1.02 REFERENCES

1.03 DEFINITIONS
- A. Piecemeal Submissions:
  Piecemeal Submissions of Submittals Prohibited! A piecemeal Submittal means providing portions of Submittals to the Architect (i.e. Product Data absent Shop Drawings , or Shop Drawings abset Product Data, or physical Samples absent Product Data and Shop Drawings, etc.) independent of each other. The submission of piecemeal Submittals results in the appearance of a submission when there is inadequate information for the Architect or Engineer to adequately review a submission. Piecemeal differs from submission of complete buildings or phases of buildings. The Architect may agree in writing to allow submission of single buildings or areas as long as the Submittals are complete, comprehensive, and ready for Architect's review.
- B. Shop Drawings:
  Shop Drawings shall illustrate, expand upon, and otherwise explain in detail such portions of the Work as are generally described in the Drawings and Specifications. Shop Drawings shall explain the Work in such a manner and in such detail as will permit approval by the Architect and understanding by those performing the Work. Shop Drawings shall not be the reproduction of Contract Documents or copy standard information as the basis of Shop Drawings. Shop Drawings shall be newly prepared content and project specific. Shop Drawings shall be drawn to scale, utilizing industry standard CAD software. Shop Drawings shall expand upon design intent, provide precise specificaitons, dimensions, materials, and construction details to ensure components fit and comply with the Contract Documents.

1.04 SYSTEM DESCRIPTIONS

1.05 SUBMITTALS
- A. General Procedures and Minimum Requirements
  1. No Work shall commence absent Approved submittals.
  2. Submit a Schedule of Submittals
     a. Submit a Schedule of Submittals including a list of submittals organized by CSI specification section number and title, along with required Contractor submission dates and review duration. The schedule shall allow sufficient time for review by the Architect and its consultants. Coordinate and incorporate submittal schedule into the construction progress schedule.

3. Schedule submissions appropriately to avoid conflict with product lead times, and far enough in advance of scheduled installation dates to provide sufficient review time and possible resubmittals.
4. Submit Complete and Coordinated Submittals
    a. All submittals will undergo intake review for completeness, coordination, and correct digital formatting prior to initial review.
    b. When a submittal is deemed complete and coordinated for review, the Architect will make (1) one initial review and (1) one follow-up review.
    c. When a submittal is deemed incomplete, Contractor must correct deficiencies and resubmit prior to Architect's initial review or follow-up review.
    d. Unless otherwise specifically authorized by Architect in writing, piecemeal submittals will be deemed incomplete.
    e. Transmit all submittals in groups corresponding to the Section of the Specifications or other portions of the Contract Documents.
5. Submittal Reviews Requiring Additional Professional Services of the Architect
    a. The Owner shall be entitled to reimbursement from the Contractor for any and all cost of such additional services.
    b. Submittal reviews requiring additional professional services of the Architect include, but are not limited to:
        1. Submittal reviews beyond the initial review and follow-up review.
        2. Excessive re-submittal attempts due to incompleteness, miscoordination, incorrect digital formatting.
        3. Expedited submittal reviews (When requested by Contractor)
        4. Submittals out-of-sequence or not in conformance with the approved Schedule of Submittals.
        5. Piecemeal/Fragmented Submittals
6. Contractor Must Identify Deviations from Contract Requirements
    a. If Product Data, Shop Drawing, Sample, Deferred Approval or other submittal required pursuant to the Contract Documents does not conform in every respect with all requirements of the Specifications and other Contract Documents (including, without limitation, any qualification of, modification of, or other deviation from such requirements), such deviation must be expressly identified and explained in detail in the submittal, noted in the accompanying transmittal letter, and identified by "clouding" or "highlighting" on the submittal.
7. All Digital Submission Required
    a. Submit Product Data, Shop Drawings, Deferred Submittals, Calculations, Reports, or other submittal required in a comprehensive digital submittal document. Document shall be formatted as a Portable Document Format (PDF) with

file extension (.pdf). Compressed files with extensions (.zip, .rar, .tar) will not be accepted.

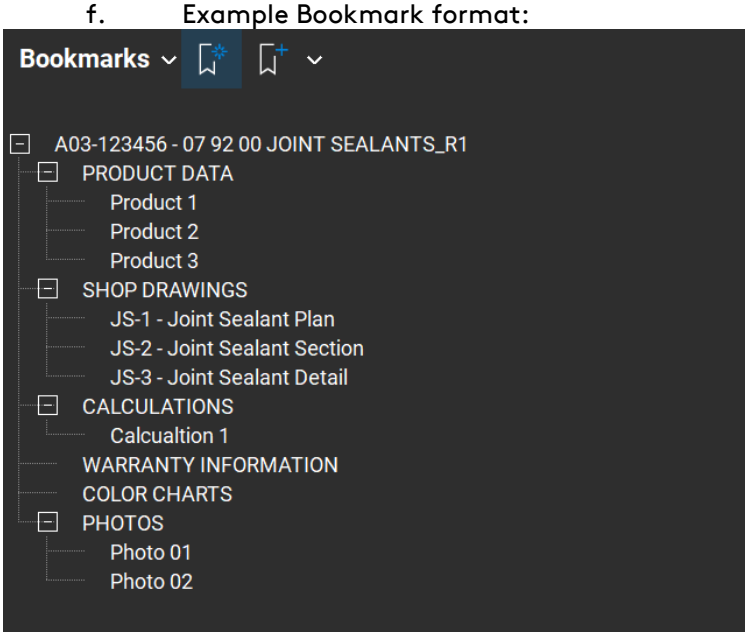
b. Material samples and color sensitive submittals shall be photographed and included in the digital submittal document. Additionally, all material samples and color sensitive submittal content shall be physically transmitted by postal service or other courier service to the Architect's office for review and approval. This process shall be appropriately timed and coordinated by the Contractor for efficient review. Review time shall not commence until all submittal components have been received by the Architect.

c. All submittals shall be digitally bookmarked by individual components within the PDF (i.e. Product Data, Shop Drawings, Calculations, Color Charts, Photos, etc.) and be coordinated with the Table of Contents.

d. Submittal file naming shall be sequentially numbered, corresponding to the Section of the Specifications or other portion of the Contract Documents.
(e.g., 07 92 00 Joint Sealants)

e. Re-submittals shall include original submission number followed by the resubmittal attempt number
(e.g., 07 92 00 R1 Joint Sealants)

f. Example Bookmark format:



g. All content shall be flattened, all layers deleted, and file size reduced/optimized for efficient transmittal and review.

B. Submittal Documents

1. Transmittal

a. All submittals must include a transmittal.

2. Cover Sheet

a. All submittals must include a cover sheet.

b. Cover sheet shall include the following minimum content:

1. DSA application number
2. Project name
3. Submittal number, title, and version corresponding to the Section of the Specifications or other portion of the Contract Documents.
4. Submittal date
5. Contractor name and contact information.
6. Subcontractor name and contact information for Work described or illustrated in the submittal

c. Document Format: 8.5-inch x 11-inch – Portrait Orientation

3. Review Stamp Sheet
   a. Architect's Review Stamp
      1. All submittals must include a 4-inch (horizontal) x 5-inch (vertical) blank space for Architect review stamp on submittal stamp sheet.
      2. All submittals must include a 4-inch (horizontal) x 5-inch (vertical) blank space for Architect's Consultant review stamp on submittal stamp sheet.
      3. All submittals must include a 4-inch (horizontal) x 5-inch (vertical) blank space for Architect's Consultant review stamp on submittal stamp sheet.
   b. Contractor's Review and Approval of Submittal Certification
      1. All submittals must include a 4-inch (horizontal) x 5-inch (vertical) space for Contractor's certification statement stamp on submittal stamp sheet.
      2. Contractor's certification stamp shall state:

PROJECT: PROJECT NAME
ARCHITECT: PJHM ARCHITECTS, INC.
OWNER: SCHOOL DISTRICT
CONTRACTOR: CONTRACTOR NAME

The Contractor has reviewed the submittal and certifies the following:

"CONTRACTOR has reviewed and approved not only the field dimensions but the construction criteria and has also made written notation regarding any information in the (submittal) shop drawings that does not conform to the Contract Documents. This shop drawing has been coordinated with all other shop drawings received to date by CONTRACTOR and this duty of coordination has not been delegated to subcontractors, material suppliers, the Architect, or the engineers on this Project.

SUBMITTAL NO.:

CONTRACTOR REVIEWER'S SIGNATURE:
DATE REVIEWED BY CONTRACTOR:

   c. Document Format: 8.5-inch x 11-inch – Portrait Orientation

4. Table of Contents
   a. All submittals shall include a Table of Contents
   b. Table of Contents shall match bookmark format.
   c. Document Format: 8.5-inch x 11-inch – Portrait Orientation

5. Product Data
    a. Identify applicable products, models, options, and other pertinent data. Supplement manufacturer's standard data to provide information unique to the Project.
    b. Submit only one product when multiple acceptable products are listed in the specification section.
    c. Document Format: 8.5-inch x 11-inch – Portrait Orientation
6. Shop Drawings
    a. Submit newly prepared information drawn to accurate scale. Highlight, cloud, or otherwise indicate deviations from the Contract Documents.
    b. DO NOT REPRODUCE CONTRACT DOCUMENTS OR COPY STANDARD INFORMATION AND SUMBIT AS SHOP DRAWINGS.
    c. Standard information prepared without specific reference to the Project will not be approved as Shop Drawings.
    d. When submitting details in Shop Drawings, indicate the corresponding detail and sheet number of the Contract Drawings.
    e. Include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings with the following details:
        1. Dimensions
        2. Identification of products and materials
        3. Compliance with specified standards
        4. Notation of coordination requirements
        5. Notation of dimensions established by field measurement
    f. The Architect will review Shop Drawings with reasonable promptness, but only for general conformance to the design concept of the project and with the information given in the Contract Documents. The Architect's favorable review of a separate item shall not indicate acceptance of an assembly in which the item functions.
    g. Shop Drawing submittal to the Architect shall be made by Contractor only, submissions by subcontractors or suppliers will not be accepted.
    h. The Architect's Shop Drawing review shall not relieve the Contractor of responsibility to for any deviation from the requirements of the Contract Documents unless the Contractor has informed the Architect in writing of such deviation at the time of submission and the Architect provides written acceptance to the specific deviation, nor shall the Architect's favorable review relieve the Contractor from responsibility for errors or omissions in the Shop Drawings.
    i. No portion of the work requiring Shop Drawings shall commence until the Shop Drawings have been returned with a favorable review by the Architect.
    j. Document Format: 100% scale, minimum 8.5-inch x 11-inch, maximum 30-inch x 42-inch.

7. Samples
    a. Submit samples to illustrate functional and aesthetic characteristics of the product with integral parts and attachment devices. Coordinate samples submittals with interfacing work.
    b. Submit samples of finishes from the full range of manufacturer's standard colors, textures, and patterns for Architect's selection. Submit custom selections where identified.
    c. Submit a minimum of five (5) samples or as specified in individual sections of the specifications. Four (4) submitted samples will be retained by the Architect. Additionally, submit photos of samples and include them in the digital submittal package.
    d. Reviewed samples may not be incorporated into the Work.
    e. Selection or rejection of samples will be made by the Architect in writing only.
    f. Document Format (Photos of Samples for digital component of submittal): 8.5-inch x 11-inch – Portrait Orientation
    g. Samples shall be submitted to the Architect's office via postal service, hand delivery, or as deemed suitable by the Architect.
8. Quality Assurance and Quality Control Submittals
    A. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, and Qualification Statements.
        1. When specified in individual specification sections, submit manufacturers' instructions for delivery, storage assembly, installation, start-up, adjusting and finishing.
        2. Identify conflicts between manufacturers' instructions and Contract Documents.
        3. When specified in individual specification sections, submit manufacturers' certificate to Architect for review.
        4. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference dates, affidavits, and certifications as appropriate.
        5. Certificates may be recent or previous test results on material or product but must be acceptable to Architect.
        6. Document Format: 8.5-inch x 11-inch – Portrait Orientation

1.06 QUALITY ASSURANCE
1.07 DELIVERY, STORAGE, AND HANDLING
1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP

1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01 42 19
REFERENCE STANDARDS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Definitions
   2. Specifications Format and Content
   3. Industry Standards
   4. Code and Standards
   5. Governing regulations/authorities

B. Products Supplied But Not Installed Under This Section

C. Products Installed But Not Supplied Under This Section

D. Related Sections

E. Allowances

F. Unit Prices

G. Measurement Procedures

H. Payment Procedures

I. Alternates

1.02 REFERENCES

The standards are referenced in these specifications by acronyms which are listed below with the full name of the sponsoring organization and the address from which copies may be obtained.

AA Aluminum Association
900 19th Street NW, Suite 300
Washington, DC 20006
www.aluminum.org

AABC Associated Air Balance Council
1518 "K" Street, NW, Suite 503
Washington, DC 20005
www.aabchq.com

AAMA American Architectural Manufacturers Association
1827 Walden Office Square, Suite 104
Schaumburg, IL 60173-4268
www.aamanet.org

AASHTO American Association of State Highway and Transportation Officials
444 North Capitol Street, Suite 249
Washington, DC 20001
www.aashto.org

AATCC American Association of Textile Chemists and Colorists
P.O. Box 12215
One Davis Drive
Research Triangle Park, NC 27709-2215
www.aatcc.org

ACI American Concrete Institute
P.O. Box 9094
Farmington Hills, MI 48333-9094
www.aci-int.org

ACPA American Concrete Pipe Association
222 West Las Colinas Blvd., Suite 641
Irving, TX 75039-5423
www.concrete-pipe.org

ADC Air Diffusion Council
104 South Michigan Avenue, Suite 1500
Chicago, IL 60603

AF&PA American Forest and Paper Association
1111 19th Street, NW, Suite 800
Washington, DC 20036
www.afandpa.org

AGA American Gas Association
400 North Capitol Street N.W.
Washington, D.C. 20001
www.aga.com

AHA American Hardboard Association
1210 West Northwest Hwy
Palatine, IL 60067-1897
www.hardboard.org

AHAM Association of Home Appliance Manufacturers
1111 19th Street NW, #402
Washington, DC 20036
www.aham.org

AI Asphalt Institute
Research Park Drive
P.O. Box 14052
Lexington, KY 40512-4052
www.asphaltinstitute.org

AIA The American Institute of Architects
1735 New York Avenue, NW
Washington, DC 20006-5292
www.e-architect.com

AISC American Institute of Steel Construction
One East Wacker Drive, Suite 3100
Chicago, IL 60601-2001
www.aisc.org

AISI American Iron and Steel Institute
P.O. Box 4321
Chestertown, MD 21690
www.steel.org

AITC American Institute of Timber Construction
7012 South Revere Parkway, Suite 140
Englewood, CO 80112
www.aitc-glulam.org

ALCA Associated Landscape Contractors of America
12200 Sunrise Valley Drive, Suite 150
Reston, VA 20191
www.alca.org

ALI Associated Laboratories, Inc.
P.O. Box 152837
1323 Wall Street
Dallas, TX 75315

ALSC American Lumber Standards Committee
P.O. Box 210
Germantown, MD 20875

AMCA Air Movement and Control Association
International, Inc.
30 West University Drive
Arlington Heights, IL 60004-1893
www.amca.org

ANLA American Nursery and Landscape Association
1250 "I" Street, NW, Suite 500
Washington, DC 20005-3922
www.anla.org

ANSI American National Standards Institute
11 West 42nd Street, 13th Floor
New York, NY 10036-8002
www.ansi.org

APA APA-The Engineered Wood Association
2130 Barret Park Drive, Suite 102
Kennesaw, GA 30144-3681
www.apawood.org

APA Architectural Precast Association
6710 Winkler Road, Suite 8

Fort Myers, FL 33919
www.archprecast.org

ARI Air Conditioning and Refrigeration Institute
4301 Fairfax Drive, Suite 425
Arlington, VA 22203
www.ari.org

ARMA Asphalt Roofing Manufacturers Association
1156-15th Street, NW, Suite 900
Washington, DC 20005
www.asphaltroofing.org

ASA Acoustical Society of America
500 Sunnyside Blvd.
Woodbury, NY 11797
www.acoustics.org

ASCE American Society of Civil Engineers
World Headquarters (703) 295-6300
1801 Alexander Bell Drive
Reston, VA 20190-4400
www.asce.org

ASHRAE American Society of Heating, Refrigerating and Air Conditioning Engineers
1791 Tullie Circle, NE
Atlanta, GA 30329-2305
www.ashrae.org

ASLA American Society of Landscape Architects
4401 Connecticut Avenue, NW, Fifth Floor
Washington, DC 20008-2369
www.asla.org

ASME ASME International
Three Park Avenue
New York, NY 10016-5990
www.asme.org

ASPE American Society of Plumbing Engineers
3617 Thousand Oaks Blvd., Suite 210
Westlake, CA 91362-3649

ASQC American Society for Quality
611 East Wisconsin Avenue
Milwaukee, WI 53201-3005
www.asq.org

ASSE American Society of Sanitary Engineers
28901 Clemens Road
Westlake, OH 44145
www.asse-plumbing.org

ASTM American Society for Testing and Materials
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959
www.astm.org

AWCI Association of the Wall and Ceiling Industries - International
307 East Annandale Road, Suite 200
Falls Church, VA 22042-2433
www.awci.org

AWI Architectural Woodwork Institute
1952 Isaac Newton Square
Reston, VA 20190
www.awinet.org

AWPA American Wood-Preservers' Association
3246 Fall Creek Highway, Suite 1900
Granbury, TX 76049-7979

AWS American Welding Society
550 NW LeJeune Road
Miami, FL 33126
www.amweld.org

AWWA American Water Works Association
6666 West Quincy Avenue
Denver, CO 80235
www.awwa.org

BHMA Builders' Hardware Manufacturers Association
355 Lexington Avenue, 17th Floor
New York, NY 10017-6603

BIA Brick Institute of America
11490 Commerce Park Drive
Reston, VA 22091-1525
www.bia.org

CE Corps of Engineers (U.S. Department of the Army)
20 Massachusetts Avenue, NW
Washington, DC 20314
CRD standards are available from:

U.S. Army Corps of Engineers
Waterways Experiment Station
Technical Report Distribution Section
Services Branch, TIC
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

CBM Certified Ballast Manufacturers Association
1422 Euclid Avenue, Suite 402
Cleveland, OH 44115-2094

CCC Carpet Cushion Council
P.O. Box 546
Riverside, CT 06878-0546
www.carpetcushion.org

CDA Copper Development Association
260 Madison Avenue, 16th Floor
New York, NY 10016-2401
www.copper.org

CGA Compressed Gas Association
1725 Jefferson Davis Highway, Suite 1004
Arlington, VA 22202-4102
www.cganet.com

CISCA Ceilings & Interior Systems Construction Association
1500 Lincoln Highway, Suite 202
St. Charles, IL 60174
www.cisca.org

CISPI Cast Iron Soil Pipe Institute
5959 Shallowford Road, Suite 419
Chattanooga, TN 37421
www.cispi.org

CLFMI Chain Link Fence Manufacturers Institute
10015 Old Columbia Road, #B-215
Columbia, MD 21046
www.chainlinkinfo.org

CPSC Consumer Product Safety Commission
East West Towers
4330 East-West Highway
Bethesda, MD 20814

CPPA Corrugated Polyethylene Pipe Association
432 North Superior Street

Toledo, OH 43604

CRA California Redwood Association
405 Enfrente Drive, Suite 200
Novato, CA 94949
www.calredwood.org

CRI Carpet and Rug Institute
310 South Holiday Avenue
Dalton, GA 30722-2048
www.carpet-rug.com

CRSI Concrete Reinforcing Steel Institute
933 North Plum Grove Road
Schaumburg, IL 60173-4758
www.crsi.org

CSSB Cedar Shake and Shingle Bureau
515 116th Avenue, NE, Suite 275
Bellevue, WA 98004-5294
www.cedarbureau.org

CTI Ceramic Tile Institute of America
12061 West Jefferson Blvd.
Culver City, CA 90230-6219
www.ceramic-tile.com

DHI Door and Hardware Institute
14170 Newbrook Drive
Chantilly, VA 20151-2223
www.dhi.org

DIPRA Ductile Iron Pipe Research Association
245 Riverchase Parkway East, Suite O
Birmingham, AL 35244
www.dipra.org

DOC Department of Commerce
5285 Port Royal Road
Springfield, VA 22161

DOT Department of Transportation
400 Seventh Street, SW
Washington, DC 20590

EIMA EIFS Industry Members Association
402 North Fourth Street, Suite 102
Yakima, WA 98901-2470
www.eifsfacts.com

EJMA Expansion Joint Manufacturers Association

25 North Broadway
Tarrytown, NY 10591-3201
www.ejma.org

EPA Environmental Protection Agency
401 "M" Street, SW
Washington, DC 20460
www.epa.gov

FCICA Floor Covering Installation Contractors Association
7439 Millwood Drive
West Bloomfield, MI 48322-1234
www.fcica.com

FM Factory Mutual
1151 Boston-Providence Turnpike
P.O. Box 9102
Norwood, MA 02062-9102
www.fmglobal.com

FCCHR Foundation for Cross-Connection Control and Hydraulic Research
University of Southern California
KAP-200 University Park MC-2531
Los Angeles, CA 90089-25319

FS Federal Standards
(Available from GSA)
470 East L'Enfant Plaza, SW, Suite 8100
Washington, DC 20407

FTI Facing Tile Institute
% Stark Ceramics
P.O. Box 8880
Canton, OH 44711

GA Gypsum Association
810 First Street NE, Suite 510
Washington, DC 20002
www.gypsum.org

GANA Glass Association of North America
3310 SW Harrison Street
Topeka, KS 66611-2279
www.glasswebsite.com/gana

HMA Hardwood Manufacturers Association
400 Penn Center Blvd., Suite 530
Pittsburgh, PA 15235-5605
www.hardwood.org

HPVA Hardwood Plywood and Veneer Association

1825 Michael Farraday Drive
P.O. Box 2789
Reston, VA 20195
www.hpva.org

IEEE Institute of Electrical and Electronic Engineers
445 Hoes Lane (212) 705-7900
Piscataway, NJ 08855-1331
www.standards.ieee.org

IESNA Illuminating Engineering Society of North America
120 Wall Street, 17th Floor
New York, NY 10005-4001
www.iesna.org

ILI Indiana Limestone Institute of America
Stone City Bank Building, Suite 400
Bedford, IN 47421
www.iliai.com

ITS Intertek Testing Services
P.O. Box 2040
3933 US Route 11
Cortland, NY 13045-7902
www.itsglobal.com

KCMA Kitchen Cabinet Manufacturers Association
1899 Preston White Drive
Reston, VA 22091-4326
www.kcma.org

LMA Laminating Materials Association
116 Lawrence Street
Hillsdale, NJ 07642-2730
www.lma.org

MBMA Metal Building Manufacturer's Association
1300 Sumner Avenue
Cleveland, OH 44115-2851
www.mbma.org

MCAA Mechanical Contractors Association of America
1385 Piccard Drive
Rockville, MD 20850-4329
www.mcaa.org

MFMA Maple Flooring Manufacturers Association
60 Revere Drive, Suite 500
Northbrook, IL 60062
www.maplefloor.org

MIA Marble Institute of America
33505 State Street
Farmington, MI 48335
www.marble-institute.com

MIA Masonry Institute of America
2550 Beverly Blvd.
Los Angeles, CA 90057
www.masonryinstitute.org

ML/SFA Metal Lath/Steel Framing Association
(A Division of the NAAMM)
8 South Michigan Avenue, Suite 1000
Chicago, IL 60603

MSS Manufacturers Standardization Society for the Valve and Fittings Industry
127 Park Street, NE
Vienna, VA 22180-4602
www.mss-hq.com

NAA National Arborist Association
P.O. Box 1094 (603) 673-3311
Amherst, NH 03031-1094
www.natlarb.com

NAAMM National Association of Architectural
Metal Manufacturers
8 South Michigan Avenue, Suite 1000
Chicago, IL 60603
www.naamm.org

NAIMA North American Insulation Manufacturers Association
44 Canal Center Plaza, Suite 310
Alexandria, VA 22314
www.naima.org

NAPA National Asphalt Pavement Association
NAPA Building
5100 Forbes Blvd.
Lanham, MD 20706-4413

NBGQA National Building Granite Quarries Association
1220 "L" Street, NW #100-167
Washington, DC 20005
www.nbgqa.com

NCMA National Concrete Masonry Association
2302 Horse Pen Road

Herndon, VA 20171-3499
www.ncma.org

NCPI National Clay Pipe Institute
P.O. Box 759
253-80 Center Street
Lake Geneva, WI 53147
www.ncpi.org

NCRPM National Council on Radiation Protection
and Measurements
7910 Woodmont Ave., Suite 800
Bethesda, MD 20814-3095
www.ncrp.com

NCSPA National Corrugated Steel Pipe Association
1255 23rd Street, NW, Suite 850
Washington, DC 20037
www.ncspa.org

NEBB National Environmental Balancing Bureau
8575 Grovemont Circle
Gaithersburg, MD 20877-4121
www.nebb.org

NECA National Electrical Contractors Association
3 Bethesda Metro Center, Suite 1100
Bethesda, MD 20814-5372
www.necanet.org

NEI National Elevator Industry
185 Bridge Plaza North, Suite 310
Fort Lee, NJ 07024

NEMA National Electrical Manufacturers' Association
1300 North 17th Street, Suite 1847
Rosslyn, VA 22209
www.nema.org

NFPA National Fire Protection Association
One Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101
www.nfpa.org

NHLA National Hardwood Lumber Association
P.O. Box 34518
Memphis, TN 38184-0518
www.natlhardwood.org

NIA National Insulation Association

99 Canal Center Plaza, Suite 222
Alexandria, VA 22314
www.insulation.org

NOFMA National Oak Flooring Manufacturers Association
P.O. Box 3009
Memphis, TN 38173-0009
www.nofma.org

NPA National Particleboard Association
18928 Premiere Court
Gaithersburg, MD 20879-1569
www.pbmdf.com

NPCA National Paint and Coatings Association
1500 Rhode Island Avenue, NW
Washington, DC 20005-5597
www.paint.org

NRCA National Roofing Contractors Association
P.O. Box 809261
Chicago, IL 60680-9261
www.roofonline.org

NRMCA National Ready Mixed Concrete Association
900 Spring Street
Silver Spring, MD 20910
www.nrmca.org

NSA National Stone, Sand and Gravel Association
2101 Wilson Blvd.
Arlington, VA 22201
www.nssga.org

NSF NSF International
P.O. Box 130140
Ann Arbor, MI 48113-0140
www.nsf.org

NSSEA National School Supply and Equipment Association
8300 Colesville Road, Suite 250
Silver Spring, MD 20910
www.nssea.org

NTMA National Terrazzo and Mosaic Association
3166 Des Plaines Avenue, Suite 121
Des Plaines, IL 60018
www.ntma.com

NUSIG National Uniform Seismic Installation Guidelines
12 Lahoma Court
Alamo, CA 94526

NWWDA The Window and Door Manufacturer's Door Association
1400 East Touhy Avenue, Suite 470
Des Plaines, IL 60018
www.wdma.org

OSHA Occupational Safety and Health Administration
(U.S. Department of Labor)
200 Constitution Avenue, NW
Washington, DC 20210

PCA Portland Cement Association
5420 Old Orchard Road
Skokie, IL 60077-1083
www.portcement.org

PCI Precast/Prestressed Concrete Institute
175 W. Jackson Blvd.
Chicago, IL 60604
www.pci.org

PDCA Painting and Decorating Contractors of America
3913 Old Lee Highway, Suite 33-B
Fairfax, VA 22030
www.pdca.com

PDI Plumbing and Drainage Institute
45 Bristol Drive (508) 230-3516
South Easton, MA 02375
www.pdionline.org

PEI Porcelain Enamel Institute
4004 Hillsboro Pike, Suite 224-B
Nashville, TN 37215
www.porcelainenamel.com

RFCI Resilient Floor Covering Institute
401 East Jefferson #102
Rockville, MD 20850
www.rfci.com

RIS Redwood Inspection Service
c/o California Redwood Association
405 Enfrente Drive, Suite 200
Novato, CA 94949-7206
www.calredwood.org

SDI Steel Deck Institute
P.O. Box 25
Fox River Grove, IL 60012
www.sdi.org

SDI Steel Door Institute
30200 Detroit Road
Cleveland, OH 44145-1967
www.steeldoor.org

SIGMA Sealed Insulating Glass Manufacturers Association
401 N. Michigan Avenue
Chicago, IL 60611-4267

SJI Steel Joist Institute
3127 Tenth Avenue, North Ext.
Myrtle Beach, SC 29577-6760
www.steeljoist.org

SMA Stucco Manufacturers Association
14006 Ventura Blvd.
Sherman Oaks, CA 91403

SMACNA Sheet Metal and Air Conditioning Contractors
National Association, Inc.
4201 Lafayette Center Drive
Chantilly, VA 20151-1209
www.smacna.org

SPI Society of the Plastics Industry, Inc.
Spray Polyurethane Division
1801 "K" Street, NW, Suite 600K
Washington, DC 20006
www.socplas.org

SPIB Southern Pine Inspection Bureau
4709 Scenic Highway
Pensacola, FL 32504-9094
www.spib.org

SPRI (Formerly: Single Ply Roofing Institute)
200 Reservoir Street, Suite 309A
Needham, MA 02494
www.spri.org

SSPC The Society for Protective Coatings
40 24th Street, Sixth Floor
Pittsburgh, PA 15222-4656

www.sspc.org

SWI Steel Window Institute
c/o Thomas Associates, Inc.
1300 Sumner Avenue
Cleveland, OH 44115-2851
www.steelwindows.com

TCA Tile Council of America
100 Clemson Research Blvd.
Anderson, SC 29625
www.tileusa.com

TPI Truss Plate Institute
583 D'Onofrio Drive, Suite 200
Madison, WI 53719

TPI Turfgrass Producers International
1855-A Hicks Road
Rolling Meadows, IL 60008
www.turfgrasssod.org

UL Underwriters Laboratories, Inc.
333 Pfingston Road
Northbrook, IL 60062
www.ul.com

UNI Uni-Bell PVC Pipe Association
2655 Villa Creek Drive, Suite 155
Dallas, TX 75234
www.uni-bell.org

USDA U.S. Department of Agriculture
14th Street and Independence Avenue, SW
Washington, DC 20250

USPS U.S. Postal Service
475 L'Enfant Plaza, SW
Washington, DC 20260-0010

WA Wallcoverings Association
401 North Michigan Avenue
Chicago, IL 60611-4267
www.wallcoverings.org

WCLIB West Coast Lumber Inspection Bureau
P.O. Box 23145
Portland, OR 97281-3145
www.wclib.org

WCMA Window Covering Manufacturers Association
355 Lexington Avenue, 17th Floor
New York, NY 10017-6603

WIC Woodwork Institute of California
P.O. Box 980247
West Sacramento, CA 95798-0247
www.wicnet.org

WLPDIA Western Lath/Plaster/Drywall Industries Association
8635 Navajo Road
San Diego, CA 92119

WMMPA Wood Molding & Millwork Producers Association
507 First Street
Woodland, CA 95695
www.wmmpa.com

WRI Wire Reinforcement Institute
P.O. Box 450
Findlay, OH 45839-0450
www.wirereinforcementinstitute.org

WWPA Western Wood Products Association - Yeon Building
522 S.W. Fifth Avenue, #500
Portland, OR 97204-2122
www.wwpa.org

1.03 DEFINITIONS

A. Regulations: Includes laws, ordinances, statutes and lawful orders issued by authorities having jurisdiction, as well as rules, conventions and agreements within the construction industry that control performance of the work.

1.04 SYSTEM DESCRIPTIONS

A. Specification Format and Content

1. Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 2004 Masterformat numbering system.
2. The sections are placed in the Project Manual in numeric sequence; however, this sequence is not complete, and the Table of Contents of the specifications must be consulted to determine the total listing of sections.
3. The section title is not intended to limit the meaning or content of the section, nor is it to be fully descriptive of the requirements specified therein.
4. The organization of the specifications shall not control the division of the work among subcontractors or establish the extent of work to be performed by any trade.

5. Specifications use certain conventions regarding style of language and the intended meaning of certain terms, words and phrases when used in particular situations or circumstances. These conventions are:
    1. Language used in Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated, shall be interpolated as the sense requires. Singular words shall be interpreted as plural and plural words interpreted as singular where applicable to maintain the context of the Contract Document indicated.
    2. Imperative and streamlined language is generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the CONTRACTOR. Subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the CONTRACTOR, or by others when so noted.
    3. The words "shall be" are implied wherever a colon (:) is used within a sentence or phrase.

B. Codes and Standards
1. Latest edition of pertaining ordinances, laws, rules, codes, regulations, standards and others of public agencies having jurisdiction of the work are intended wherever reference is made in either the singular or plural to Code or Building Code except as otherwise specified, including but not limited to latest edition of those in the following listing.
2. Partial List of Applicable Codes
    a. 2025 California Administrative Code, C.C.R., Title 24, Part 1
    b. 2025 California Building Code, C.C.R., Title 24, Part 2
    c. 2025 California Electrical Code, C.C.R., Title 24, Part 3
    d. 2025 California Mechanical Code, C.C.R., Title 24, Part 4
    e. 2025 California Plumbing Code, C.C.R., Title 24, Part 5
    f. 2025 California Energy Code, C.C.R., Title 24, Part 6
    g. 2025 California Historical Building Code, C.C.R., Title 24, Part 8
    h. 2025 California Fire Code, C.C.R., Title 24, Part 9
    i. 2025 California Existing Building Code, C.C.R., Title 24, Part 10
    j. 2025 California Green Building Standards Code, C.C.R, Title 24, Part 11
    k. 2025 California Referenced Standards Code, C.C.R., Title 24, Part 12
3. List of Applicable Standards
    a. For a list of applicable standards, including California Amendments to the NFPA Standards, refer to California Building Code Chapter 35 and California Fire Code Chapter 80.
4. A copy of C.C.R. Title 24, Parts 1-12 must be kept on site during construction.
5. All addenda and construction change documents must be signed by the ARCHITECT and approved by DSA.

C. Industry Standards

1. Except where Contract Documents include more stringent requirements, applicable construction industry standards shall apply as if bound into the Contract Documents to the extent referenced. Such standards are made part of Contract Documents by reference.
2. Conform to reference standard by date of issue current on date for receiving bids except when a specific date is indicated.
3. Where compliance with two (2) or more standards is specified and where standards may establish different or conflicting requirements for quantities or quality levels, the more stringent, higher quality and greater quantity of work shall apply.
4. The quantity or quality level shown or specified shall be the minimum provided or performed. Indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements.
5. Each entity engaged in construction of the work is required to be familiar with industry standards applicable to its construction activity.
6. Copies of applicable standards are not bound with the Contract Documents. Where copies of standards are needed to perform a required activity, CONTRACTOR shall obtain copies directly from publication source.
7. Trade association's names and titles of general standards are frequently abbreviated. Where such abbreviations are used in the Specifications or other Contract Documents, they shall mean the recognized trade association, standards-generating organization, authority having jurisdiction or other entity applicable to the content of the text provision. Refer to the "Encyclopedia of Associations", published by Gale Research Co., available in most libraries. A partial list is included at the end of this section.
8. Refer to individual specification sections and related drawings for names and abbreviations of trade associations and standards applicable to specific portions of the work.
9. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.05 SUBMITTALS
1.06 QUALITY ASSURANCE
1.07 DELIVERY, STORAGE, AND HANDLING
1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01 45 00
QUALITY CONTROL

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  1. Quality assurance and control of installation.
  2. Certifications
  3. Field samples.
  4. Mock-up.
  5. Manufacturers' field services and reports.
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES
1.03 DEFINITIONS
1.04 SYSTEM DESCRIPTIONS
1.05 SUBMITTALS
1.06 QUALITY ASSURANCE
- A. Qualifications
  1. Monitor quality control over suppliers, manufacturers, products, services, site conditions and workmanship to produce work of specified quality.
  2. Comply fully with manufacturers' instructions including each step in sequence.
  3. Should manufacturers' instructions conflict with Contract Documents, request clarification from ARCHITECT before proceeding.
  4. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes or specified requirements indicate higher standards or more precise workmanship.
  5. Perform work by persons qualified to produce workmanship of specified quality.
  6. Where experience minimums for workmen, applicators, companies or manufacturers are required in individual sections, written certification and documentation substantiating such minimums shall be submitted and approved by the ARCHITECT, when requested.
  7. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.
- B. Regulatory Requirements

1. All work pertaining to and all materials supplied for executing and completing this Contract shall comply with provisions specified in the Contract Documents and with all applicable laws, regulations and ordinances governing Work.
2. All work pertaining to and all materials supplied for executing and completing this Contract shall comply with the provisions outlined in the List of Required Structural Tests & Special Inspection, DSA form 103.
    a. Structural tests and special inspections noted on this form are those that will be performed by the Geotechnical Engineer of Record, Laboratory of Record, or Special Inspector.
    b. The actual complete test and inspection program must be performed as detailed on the DSA approved documents.
    c. The appendix at the bottom of this form identifies work NOT subject to DSA requirements for special inspection or structural testing. The project inspector is responsible for providing inspection of all facets of construction, including but not limited to, special inspections not listed on this form such as structural wood framing, high-load wood diaphragms, cold-formed steel framing, anchorage of non-structural components, etc., per Title 24, Part 2, Chapter 17A.
3. Stop Work and Order to Comply (In accordance with DSA IR A-13)
    a. The Division of the State Architect (DSA) may issue a Request for District/Owner to Stop Work, a Stop Work Order or an Order to Comply, when either of the following occurs:
        1. Construction proceeds without DSA approved construction documents.
        2. Construction proceeds without a DSA certified project inspector specifically approved by DSA for the project.
        3. To correct work that is not in compliance with approved documents and ensure that non-compliant construction is not concealed by subsequent work.
        4. Any other circumstances where DSA determines that construction work is not being performed in accordance with applicable rules and regulations, and would compromise the structural integrity of the building, thereby endangering the public safety.
4. All work pertaining to and all materials supplied for executing and completing this Contract shall comply with the provisions outlined in the Project Inspector and Assistant Inspector Duties and Performance, DSA IR A-8.

C. Certifications
1. Manufacturers' Field Services and Reports
    a. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of

workmanship, start-up of equipment, test, adjust and balance of equipment and as applicable and to initiate instructions when necessary.

b. Manufacturer's Representatives shall report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

c. Submit report of observation to ARCHITECT for review.

D. Field Samples

1. Install field samples at the site as required by individual specifications sections for review by ARCHITECT.
2. Accepted samples represent a quality level for the Work.
3. Where field sample is specified in individual sections to be removed, clear area after field sample has been accepted by ARCHITECT and is no longer required for reference.

E. Mock-ups

1. Tests will be performed under provisions identified in this section.
2. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals and finishes.
3. Where mock-up is specified in individual sections to be removed, clear area after mock-up has been accepted by ARCHITECT and is no longer required for reference.

F. Pre-installation Meetings

1. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to attend meetings regarding installation of specified Work.

1.07 DELIVERY, STORAGE, AND HANDLING
1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01 52 00
CONSTRUCTION FACILITIES

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  - 1. Furnishing and Installing:
    - a. Temporary Water
    - b. Temporary Sanitary Facilities
    - c. Fences and Barricades
    - d. Construction Equipment
    - e. Storage
    - f. Temporary Job Office
    - g. Temporary Electrical & Lighting
    - h. Temporary Heat
    - i. Temporary Ventilation
    - j. Barriers
    - k. Noise Control
    - l. Pollution Control
    - m. Exterior Enclosures
    - n. Access Roads
    - o. Progress Cleaning
    - p. Fire Protection
    - q. Site Safety Plan
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES
1.03 DEFINITIONS
1.04 SYSTEM DESCRIPTIONS
1.05 SUBMITTALS
1.06 QUALITY ASSURANCE
1.07 DELIVERY, STORAGE, AND HANDLING
1.08 PROJECT CONDITIONS
- A. Regulatory Requirements
  - 1. Comply with governing regulations and utility company regulations and recommendations.
  - 2. Comply with pollution and environmental protection regulations for use of water and energy, for discharge of wastes and storm drainage from Project Site and for control of dust, air pollution and noise.
  - 3. Temporary construction shall conform to requirements of State, County and Local authorities and underwriters which pertain to operation, health, safety and fire hazard. CONTRACTOR shall

furnish and install items necessary for conformance with such requirements, whether or not called for under the separate divisions of these specifications.

B. Temporary Water
   1. The OWNER shall provide construction water at the closest existing fire hydrant as approved by the local jurisdiction. OWNER supplied point of connection shall include applicable temporary meter and backflow devices. CONTRACTORS requiring construction water shall provide all labor and materials (including cut and patch) to distribute.

C. Temporary Sanitary Facilities
   1. CONTRACTOR will provide and maintain required temporary chemical type toilet facilities and enclosures.
   2. Existing facilities shall not be used.

D. Fences and Barricades
   1. After completion of site grading and before start of Work on the project site, CONTRACTOR may install a six (6) foot high temporary chain link fence with locked entrance gates to substantially enclose the entire project site. Any activities schedule to commence prior to the installation of fencing will be temporarily fenced by CONTRACTOR requiring same.
   2. The CONTRACTOR requiring same shall construct and maintain planking, barricades, lights and warning signs as indicated as required by Local authorities and State safety ordinances and as necessary for the protection of the public.

E. Construction Equipment
   1. CONTRACTOR shall erect, equip and maintain construction equipment in strict accordance with applicable statues, laws, ordinances and regulations of authority having jurisdiction.
   2. CONTRACTOR shall provide, maintain and move upon completion of the Work all temporary rigging, scaffolding, hoisting equipment, rubbish chutes, ramps, stairs, runways, platforms, ladders, railings and other temporary construction as required for all work hereunder.

F. Storage
   1. Operations of the CONTRACTOR, including storage of materials, shall be confined to areas approved by OWNER. CONTRACTOR shall be liable for damage caused by him/her during such use of property of the OWNER or other parties. CONTRACTOR shall save the OWNER along with their respective officers, employees and agents, and the ARCHITECT and his employees, free and harmless from liability of any nature or kind arising from any use, trespass or damage occasioned by his operations on premises of third persons. Storage facilities shall provide protection of products from excessive cold, heat, moisture, humidity or physical abuse as specified in the respective sections for the products stored. Each CONTRACTOR requiring same shall provide their own temporary storage and security for same.
   2. Staging areas will be under the supervision of the CONTRACTOR. Materials shall be placed and relocated as necessary for the progress of the project.

G. Temporary Job Office
   1. Should any CONTRACTOR require office space, the CONTRACTOR requiring office space shall provide.

H. TEMPORARY ELECTRICAL POWER AND LIGHTING
   1. Contractor shall provide temporary electrical power & lighting for duration of project. Contractor shall pay for power during the course of the Work. Contractor shall be responsible for providing temporary facilities & distribution required to deliver that power service from its existing location on Site to point of intended use.
   2. Contractor shall verify characteristics of power available at site. Contractor shall take all actions required to make modifications where power of higher voltage or different phases of current are required. Contractor shall be fully responsible for providing that service and shall pay all costs required.
   3. Permanent convenience receptacles may NOT be utilized during construction.
   4. Contractor shall furnish, wire for, install, and maintain temporary electrical lights wherever it is necessary to provide illumination for the proper performance and/or observation of the Work: a minimum of 20 foot-candles for rough work and 50 foot-candles for finish work.
   5. Contractor shall be responsible for maintaining existing lighting levels in the project vicinity should temporary outages or service interruptions occur.'

I. Temporary Heat
   1. Temporary heat will be supplied and maintained by the CONTRACTOR requiring same.
   2. Do not use permanent equipment for temporary heating purposes unless specifically noted otherwise in the contract documents.

J. Temporary Ventilation
   1. All CONTRACTORS shall ventilate enclosed areas to assist cure of materials, dissipate humidity and to prevent accumulation of dust, fumes, vapors or gases as the above may be generated by them.

K. Barriers
   1. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
   2. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
   3. Provided protection for plant life and trees designated to remain and for soft and hardscape areas adjacent to work, replace damaged materials as directed by the ARCHITECT.
   4. Protect non-owned vehicular traffic, stored materials, site and structures from damage.
   5. Construction workers shall not interact or communicate with students or staff except in emergency or safety related situations. (Post a sign to this effect at entry.)

L. Noise Control
   1. CONTRACTORS shall ensure that all construction equipment utilized include noise-reduction features (e.g., mufflers and engine

shrouds) that are no less effective than those originally installed by the manufacturer of such equipment.

2. CONTRACTORS shall review and be knowledgeable of any CEQA documentation for this project restricting or limiting noise, and implement any and all scheduling or mitigation methods necessary to conform with the CEQA documents. This includes any Mitigated Negative or Negative Declaration instrument the OWNER has produced.
3. CONTRACTORS shall review and be knowledgeable of any federal, state or local agency requirements for noise restrictions and adhere to the policies outlined by the applicable laws and codes.

M. Pollution Control
1. Provide methods, means and facilities to prevent contamination of soil, water and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.

N. Exterior Enclosures
1. Provide temporary weather-tight closure of exterior openings to accommodate acceptable working conditions and protection for materials, to allow for temporary heating and maintenance or required ambient temperatures identified in individual specification Sections and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

O. Access Roads
1. Provide and maintain access to fire hydrants, free of obstructions.
2. Existing on-site roads may be used for construction traffic.
3. CONTRACTORS may not park or drive on concrete walks or in the buildings at any time.

P. Progress Cleaning
1. Maintain areas free of waste materials, debris and rubbish. Maintain site in a clean and orderly condition.
2. Each applicable CONTRACTOR shall remove debris and rubbish from pipe chases, plenums, attics, crawl spaces and other closed or remote spaces prior to the space being enclosed.
3. Each applicable CONTRACTOR shall broom and vacuum clean interior areas prior to start of surface finishing and continue cleaning to eliminate dust.
4. Remove waste materials, debris and rubbish from site periodically and dispose off-site.

Q. Fire Protection
1. Fire protection during construction shall be provided in accordance with CFC, Chapter 33.

R. Site Safety Plan
1. This project will be required to comply with DSA BU_24-05. The Contractor (in collaboration with the District) shall be responsible for developing a campus specific SITE SAFETY PLAN (SSP). This document shall be submitted to the Architect via the project submittal procedure process and will be submitted to DSA for review and approval. Examples of Site Safety Plans (SSP) may be provided at the discretion of the Architect. PDF copies of BU_24-05 can be found at www.dgs.ca.gov.

1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01 57 00
TEMPORARY CONTROLS

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  1. Water Control
  2. Dust Control
  3. Erosion and Sediment Control
  4. Noise Control
  5. Pollution Control
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES
1.03 DEFINITIONS
1.04 SYSTEM DESCRIPTIONS
1.05 SUBMITTALS
1.06 QUALITY ASSURANCE
1.07 DELIVERY, STORAGE, AND HANDLING
1.08 PROJECT CONDITIONS
- A. Project Environmental Requirements
  1. Water Control
     a. Do not permit surface or subsurface water or other liquids to accumulate in or about the premises and vicinity thereof. Should such conditions be encountered or develop, control the water or other liquid and suitably dispose of it by means of temporary pumps, piping, drainage lines, troughs, ditches, dams or other methods as approved by the ARCHITECT and/or the authority having jurisdiction.
  2. Dust Control
     a. Conduct earthwork operations in a manner to prevent windblown dust and dirt from interfering with the progress of the Work, the OWNER'S activities and the existing occupied structures in the areas immediately adjacent as well as adjacent properties.
     b. Periodically water construction areas as required to minimize accumulation of dust and dirt.
     c. Water spray or cover with tarpaulins truck loads of soil to additionally minimize generation of dust and dirt from construction operations.
     d. Prevent dust and dirt from accumulating on walks, roadways, parking areas and from washing into sewer and storm drain lines.

3. Erosion and Sediment Control
    a. Plan and execute construction by methods to control surface drainage from cuts and fills from borrow and waste disposal areas. Prevent erosion and sedimentation.
    b. Minimize amount of bare soil exposed at one time.
    c. Provide temporary measures such as berms, dikes and drains to prevent water flow over adjacent properties or City rights-of-way.
    e. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
    f. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
4. Noise Control
    a. Avoid excessive noise where adjacent operations may be detrimentally affected.
5. Pollution Control
    a. Provide methods, means and facilities to prevent contamination of soil, water and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.
    b. Burning of refuse, debris or other materials will not be permitted on the Site.
    c. Comply with regulatory requirements and anti-pollution ordinances during the course of construction and disposal operations.
6. Removal
    a. Remove all temporary control measures in accordance with regulatory requirements at the completion of construction.

B. Existing Conditions

1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  1. Products
  2. Transportation and Handling
  3. Storage and Protection
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS
- A. Products
  1. Products: Means new material, machinery, components, equipment, fixtures and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
  2. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
  3. Provide interchangeable components of the same manufacturer for similar components.
  4. The ARCHITECT may reject as non-complying such material and products that do not bear identification satisfactory to the ARCHITECT as to manufacturer, grade, quality and other pertinent.
  5. In event of damage, promptly make replacements and repairs to the approval of the ARCHITECT and at no additional cost to the OWNER.
  6. Additional time required to secure replacements and to make repairs will not be considered by the ARCHITECT to justify an extension in the Contract Time of Completion.

1.05 SUBMITTALS

1.06 QUALITY ASSURANCE

1.07 DELIVERY, STORAGE, AND HANDLING
- A. Packing, Shipping, Handling, and Unloading
  1. Transport and handle products in accordance with manufacturer's instructions.
  2. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement or damage.

B. Acceptance at Site
   1. Promptly inspect shipments to assure that products comply with requirements, quantities are correct and products are undamaged.

C. Storage and Protection
   1. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.
   2. For exterior storage of fabricated products, place on sloped supports, above ground and protect as necessary to prevent deterioration or damage to the product.
   3. When approved by the OWNER, provide off-site storage and protection in a bonded warehouse approved by OWNER when site does not permit on-site storage or protection at no cost to the OWNER.
   4. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
   5. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
   6. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement or damage.
   7. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

D. Waste Management and Disposal

1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01 74 00
CLEANING AND WASTE MANAGEMENT

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  1. Provide throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in the section.
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES
1.03 DEFINITIONS
1.04 SYSTEM DESCRIPTIONS
- A. Conduct daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.
- B. In addition to the standards described in this section, comply with pertinent requirements of governmental agencies having jurisdiction.

1.05 SUBMITTALS
1.06 QUALITY ASSURANCE
1.07 DELIVERY, STORAGE, AND HANDLING
1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

3.01 INSTALLERS
3.02 EXAMINATION
3.03 PREPARATION
3.04 ERECTION
3.05 INSTALLATION
3.06 APPLICATION
3.07 CONSTRUCTION

3.08 REPAIR/RESTORATION
3.09 RE-INSTALLATION
3.10 FIELD QUALITY CONTROL
3.11 ADJUSTING
3.12 CLEANING

A. Cleaning of Materials and Equipment
   1. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

B. Compatibility
   1. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

C. Progress Cleaning
   1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
   2. So not allow accumulation of scrap, debris, waste material, and other items not required for construction of this work.
   3. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.
   4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.
   5. Site
      a. Clean daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
      b. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Restack, tidy, or otherwise service arrangements as needed.
      c. Maintain the site in a neat and orderly condition at all times.
   6. Structures
      a. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
      b. Weekly, and more often if necessary, sweep interior spaces clean. "Clean" for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held broom.
      c. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions hereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.
      d. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials are installed. "Clean" for the purpose of this subparagraph, shall be interpreted as meaning free from

foreign material which, in the opinion of the ARCHITECT, may be injurious to the finish floor material.

D. Final Cleaning
   1. "Clean" for the purpose of this article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.
   2. Prior to completion of the work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste.
   3. Site
      a. Broom clean paved areas on the site and public paved areas adjacent to the site.
      b. Completely remove resultant debris.
   4. Structures
      a. Exterior
         1. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
         2. Remove all traces of splashed materials from adjacent surfaces.
         3. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.
         4. In the event of stubborn stains not removable with water, the architect may require light sandblasting or other cleaning at no additional cost to the OWNER.
      b. Interior
         1. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
         2. Remove all traces of splashed material from adjacent surfaces.
         3. Remove paint droppings, spots, stains, and dirt from finished surfaces.
      c. Glass
         1. Clean inside and outside.
      d. Polished surfaces
         1. To surfaces requiring routine application of buffed polish, apply the polish recommended by the manufacturer of the material being polished.
      e. Schedule final cleaning as approved by the architect to enable the OWNER to accept a completely clean work.

E. Cleaning During Owner's Occupancy
   1. Should the OWNER occupy the work or any portion hereof prior to its completion by the contractor and acceptance by the OWNER, responsibilities for interim and final cleaning shall be as determined by the ARCHITECT in accordance with the General Conditions of the contract.

3.13 DEMONSTRATION
3.14 PROTECTION
3.15 SCHEDULES

END OF SECTION

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  1. Closeout procedures
  2. Adjusting
  3. Project record documents
  4. Operation and maintenance data
  5. Warranties and Guarantees
  6. Spare parts and maintenance materials
  7. Instructions to OWNER'S personnel
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS
- A. Closeout Procedures
  1. Partial Occupancy and Substantial Completion:
     - a. Conform to General Conditions for Closeout Procedures.
     - b. Prepare a list of items to be completed or corrected, aka 'Punch List'. List may be developed by areas, when approved by the ARCHITECT.
     - c. Within a reasonable time after receipt of the list, the ARCHITECT will inspect to determine status of completion.
     - d. Should the ARCHITECT determine that Work is not substantially complete:
       1. The ARCHITECT will promptly notify the OWNER and CONTRACTOR in writing, giving the reasons for his determination.
       2. CONTRACTOR shall remedy the deficiencies and notify the ARCHITECT when Work is ready for re-inspection.
       3. The ARCHITECT will re-inspect the Work.
     - e. When the ARCHITECT concurs that work is substantially complete:
       1. The ARCHITECT will prepare a "Certificate of Substantial Completion" on AIA Form G704, accompanied by the CONTRACTOR'S list of items to be completed or corrected as verified by the ARCHITECT.

2. The ARCHITECT will submit the Certificate to the OWNER and to the CONTRACTOR for their written acceptance of the responsibilities assigned to them in the Certificate.

2. Final Completion:
   a. Prepare and submit a notice that Work is ready for final inspection and acceptance.
   b. Verify the Work is complete.
   c. Certify that:
      1. Work has been inspected by all governing agencies and is in compliance with Contract Documents.
      2. Work has been inspected for compliance with the Contract Documents.
      3. Work has been completed in accordance with the Contract Documents.
      4. Equipment and systems have been tested as required and are operational.
      5. Work is completed and ready for final inspection.
   d. The ARCHITECT will make an inspection to verify status of completion.
   e. Should the ARCHITECT determine the Work is incomplete or defective:
      1. The ARCHITECT will promptly notify the OWNER and CONTRACTOR in writing, listing incomplete or defective work.
      2. CONTRACTOR shall remedy the deficiencies promptly and notify the ARCHITECT when ready for re-inspection.
   f. When the ARCHITECT determines the Work is acceptable under the Contract Documents, he will request the CONTRACTOR to make closeout submittals.
3. Closeout submittals include, but are not necessarily limited to:
   a. Project Record Documents.
   b. Operation and maintenance data for items so listed in pertinent Sections of these Specifications and for other items when so approved by the ARCHITECT.
   c. Warranties and Guarantees.
   d. Keys and keying schedule.
   e. Spare parts, materials, extra stock to be turned over to the OWNER.
   f. Evidence of payment and release of liens.
   g. List of subcontractors, service organizations and principal vendors, including names, addresses and telephone numbers, where they may be contacted for emergency service at all times, including nights, weekends and holidays.
4. Final Payment:
   a. Submit a Final Payment Request, showing all adjustments to the Contract Sum.
   b. Retention will be released no sooner than thirty-five (35) days and not later than sixty (60) days after Notice of

Completion has been recorded with the County Recorder's Office.

1.05 SUBMITTALS

A. Product Data
B. Shop Drawings
C. Samples
D. Quality Assurance/Control Submittals
E. Closeout Submittals
    1. Project Record Documents
        a. OWNER will provide one (1) set of drawings and one (1) copy of the Project Manual for use during construction to record changes made during construction manually. CONTRACTORS installing underground utilities shall provide electronic as-built documentation.
        b. Record in concise and neat manner and on a weekly basis all actual revisions to the work:
            1. Changes made on the Drawings, including Clarification Drawings.
            2. Changes made to the Specifications.
            3. Changes made by Addenda.
            4. Changes made by Change Directive.
            5. Change Orders or other authorized Modifications to the Contract.
            6. Revisions made to shop drawings, product data and samples.
        c. Store Record Documents separate from documents used for construction. Replace soiled or illegible documents.
        d. Record information concurrent with construction progress.
        e. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:
            1. Manufacturer's name, trade name, product model and number and supplier.
            2. Authorized product substitutions or alternates utilized.
            3. Changes made by Addenda and Modifications.
        f. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
            1. Measured depths of foundations in relation to finish first floor datum.
            2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Identify drains and sewers by invert elevation.
            3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work. Identify ducts, dampers, valves, access doors and control equipment wiring.

4. Field changes of dimension and detail.
5. Details not on original Drawings.

g. The OWNER will require the preparation of a final reproducible "RECORD SET" of drawings that incorporate all changes made during the construction process to include incorporation of all change orders, addenda, field orders and "As Installed" conditions noted on the CONTRACTOR prepared record documents. The preparation and printing cost of the "RECORD SET" is part of the contract.

2. Operation And Maintenance Data
   a. Submit three (3) sets prior to final inspection, bound in 8½ x 11 inch text pages, in binders with durable covers, tabbed by specification section and/or other organizing heading.
   b. Deliver to OWNER, itemized and inventoried on transmittal.
3. Warranties and Guarantees
   a. Submit three (3) wet-signed originals separate from Operation and Maintenance data.
   b. Manufacturer's warranties and guarantees notwithstanding, warrant entire Work against defects in materials and workmanship for twelve (12) months from date of Substantial Completion. Warranties and guarantees between CONTRACTOR and manufacturers and CONTRACTOR and suppliers shall not affect warranties or guarantees between CONTRACTOR and OWNER.
   c. Execute and assemble documents from subcontractors, suppliers and manufacturers.
   d. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten (10) days after acceptance, listing date of acceptance as start of warranty period.
   e. Deliver to OWNER, itemized and inventoried on transmittal.
4. Underground Wet Utility Video
   a. Upon completion of the storm drain system, the CONTRACTOR shall fully flush the storm drain system and confirm proper functionality. Additionally, the CONTRACTOR shall provide all services necessary to electronically view and record (video) the improvements to the storm drain system. The CONTRACTOR shall turn-over two (2) copies of the documented review (DVD or media of the OWNER'S choice) of the storm drain system at the completion of the project.
   b. Upon completion of the sewer system, the CONTRACTOR shall fully flush the sewer system and confirm proper functionality. Additionally, the CONTRACTOR shall provide all services necessary to electronically view and record (video) the improvements to the sewer system at all interior clean outs and main lines and all exterior building P.O.C./cleanout out to the public system P.O.C. The CONTRACTOR shall turn-over two (2) copies of the documented review (DVD or media of the OWNER'S choice) of the sewer system at the completion of the project.

c. Deliver to OWNER, itemized and inventoried on transmittal.

5. Instructions to OWNER'S Personnel
   a. Instruct the OWNER'S personnel in proper operation and maintenance of all systems, equipment and similar items, which were provided as part of the work. Provide maintenance and inspection schedules that conform to manufacturer's recommendations.
   b. CONTRACTOR shall provide a schedule to the OWNER for approval for each of the instruction periods required.
      1. Organize the instruction sessions into group sizes and schedule the elapsed time for instruction in a manner to provide complete coverage of the subject matter. Video each session and provide OWNER with two (2) copies on DVD.
   c. Instruction sessions will be held in a OWNER designated area on the project site and at OWNER'S convenience. Amount of time required for each session shall be as specified in individual sections.
   d. Instructors shall be qualified by the product manufacturer in the subject matter presented at each session.
      1. Submit names of instructors and qualifications to the ARCHITECT and OWNER for approval thirty (30) days prior to each scheduled session.
      2. Substitution of instructors will not be permitted without prior approval of ARCHITECT or OWNER.

1.06 QUALITY ASSURANCE
1.07 DELIVERY, STORAGE, AND HANDLING
1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE
   A. Extra Materials
      1. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.
   B. Maintenance Service

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01 78 30
WARRANTIES AND BONDS

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  1. Preparation and submittal
  2. Time and schedule of submittals
  3. Guarantee Form
  4. Contractor's Certificate Regarding Asbestos Material Form
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS

1.05 SUBMITTALS
- A. Form of Submittals
  1. Bind in commercial quality, 8½ x 11 inch, three-ring side binders with hardback, cleanable, plastic covers.
  2. Label cover of each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of CONTRACTOR and equipment supplier; and name of responsible principal.
  3. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified and the name of the product or work item.
  4. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List subcontractor, supplier and manufacturer, with name, address and telephone number of responsible principal.
- B. Preparation of Submittals
  1. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers and manufacturers, within ten (10) days after completion of the applicable item or work. Except for items put into use with OWNER'S permission, leave date of beginning of time of warranty until the Date of Substantial Completion is determined.
  2. Verify that documents are in proper form, contain full information and are notarized.
  3. Co-execute submittals when required.
  4. Retain warranties and bonds until time specified for submittal.

C. Time of Submittals
   1. For equipment or component parts of equipment put into service during construction with OWNER'S permission, submit documents within ten (10) days after acceptance.
   2. Make other submittals within ten (10) days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work when acceptance is delayed beyond Date of Substantial Completion, submit within ten (10) days after acceptance, listing the date of acceptance as the beginning of the warranty period.

1.06 QUALITY ASSURANCE
1.07 DELIVERY, STORAGE, AND HANDLING
1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

NOT APPLICABLE

GUARANTEE

We hereby guarantee that the

_____, (Item/Equipment)

which we have installed for

_____ (Owner)

at

_____, (Project name)

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 which may be displaced in connection with such replacement within a minimum period of ONE (1) YEAR from the date of acceptance of the above-mentioned project by

_____, (Owner) ordinary wear and tear and unusual abuse or neglect excepted.

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 OWNER, but not later than ten (10) working days after being notified in writing by the OWNER, the undersigned authorizes the OWNER to proceed to have said defects repaired and made good at the expense of the undersigned, which will pay the costs and charges therefore upon demand.

_____ (Contractor)

_____ (Signed)

_____ (Printed Name)

Representatives to be contacted for service subject to terms of contract.

_____(Name)

_____(Address)

_____(Email)

_____(Phone Number)

CONTRACTOR'S CERTIFICATE
REGARDING ASBESTOS MATERIAL

This form is to be submitted at the time final billing is provided.

> "I certify that all the materials and supplies installed under this contract are free of asbestos-containing materials."

_____(Name of Contract)

_____(Date)

_____(Official Name of CONTRACTOR)

_____(By)

_____(Title)

_____(Signature)

END OF SECTION

SECTION 03 10 00
CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  - 1. Formwork for cast-in-place concrete including:
    - a. Earthen Forms
    - b. Wood Forms
    - c. Form Lumber
    - d. Form Accessories
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
  - 1. 03 30 00 Cast-In-Place Concrete
  - 2. 32 13 13 Concrete Paving
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES
- A. C.C.R., Title 24, Part 2
- B. ACI 318-14 Building Code Requirements for Structural Concrete
- C. ACI 347R-14 Guide to Formwork for Concrete
- D. APA Publication V345 Design/Construction Guide: Concrete Forming
- E. WWPA Technical Guide

1.03 DEFINITIONS
- A. ACI: American Concrete Institute
- B. WWPA: Western Wood Products Association

1.04 SYSTEM DESCRIPTIONS
- A. Design Requirements, Performance Requirements
  - 1. All work shall conform to ACI 318-14 standards.
  - 2. All work shall conform to ACI 347R-14 standards.
  - 3. All work shall conform to structural specifications and details.
  - 4. Forms and falsework shall adequately support live and dead loads, including equipment, concrete drops, pressures of foundations, etc.
  - 5. Design of formwork for structural stability and sufficiency is the sole responsibility of the workers and contractors.

1.05 SUBMITTALS
- A. Product Data
  - 1. Submit manufacturer’s product data for materials and accessories specified.

B. Shop Drawings
   1. Submit detailed structural calculations and drawings approved and signed by a California registered Civil Engineer where the height of the falsework or vertical shoring, as measured from the top of the sills to the soffit of the superstructure exceeds 14 feet, or where individual horizontal span lengths exceed 16 feet, or where provision for vehicular traffic through falsework or shoring occurs. For all other falsework and shoring submit layout signed by California registered Civil Engineer, manufacturer's authorized representative or a licensed contractor experienced in the usage and erection of falsework and vertical shoring. A copy of the plans and calculations shall be available at the jobsite at all times.
   2. Submit detailed drawings indicating locations of forms, construction and expansion joints, embedded items, and accessories.
C. Samples
D. Quality Assurance/Control Submittals
   1. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, Qualification Statements
E. Closeout Submittals

1.06 QUALITY ASSURANCE
A. Qualifications
B. Regulatory Requirements
   1. C.C.R., Title 24, Part 2, Chapter 19A
   2. C.C.R., Title 8, Division 1, Chapter 4
C. Certifications
   1. All engineered wood product forms shall bear the APA trademark.
D. Field Samples
E. Mock-ups
F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING
A. Packing, Shipping, Handling, and Unloading
   1. Deliver materials to site with labels clearly identifying product name and manufacturer.
   2. Handle tube forms per manufacturer's instructions. Do not drop forms.
B. Acceptance at Site
C. Storage and Protection
   1. Store all materials to prevent damage and permit access to materials for inspection and identification.
   2. Store tube forms in accordance with manufacturer's instructions
D. Waste Management and Disposal

1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING

1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS
- A. Tube Forms
  - 1. Sonoco, 1 North Second Street, Hartsville, South Carolina, 29550
  - 2. Ceme-Tube, 579 Schommer Dr., Hudson, WI 54016
- A. Releasing Agents
  - 1. W.R. Meadows, Inc., P.O. Box 338, Hampshire, IL 60140
  - 2. Nox-Crete, 1444 S 20th St., Omaha, NE 68108

2.02 EXISTING PRODUCTS
2.03 MATERIALS
- A. Concrete Formwork
  - 1. Earthen Forms
    - a. Provide earthen forms as indicated on drawings only for footings where the soil is firm and stable and the concrete will not be exposed, and as approved or directed.
    - b. Cut earthen forms square, neat and accurate to size.
    - c. Maintain clean bottoms of excavations.
  - 2. Wood Forms
    - a. Provide sound, undamaged, and clean forms per APA standards:
      - 1. APA Plyform Class 1
      - 2. B-B Exterior Type
      - 3. High Density overlaid surface on one side
      - 4. Not mill oiled
      - 5. 3/4-inch thick for exposed locations, min. 5/8-inch thick for unexposed locations.
    - b. Provide additional treatment of release agent if forms are not fresh.
    - c. Form sheathing shall meet the requirements of Voluntary Product Standard, PS 1-09.
  - 3. Form Lumber
    - a. Provide sound, undamaged, lumber for forming, studding, and bracing per WWPA standards:
      - 1. Species: Douglas Fir-Larch
      - 2. Grade: No.1 or better
  - 4. Tube Forms
    - a. Provide sound, undamaged, seamless forms in one-piece lengths.
      - 1. (Sonoco) Sonotube Finish Free
      - 2. (Chem-Tube) Standard Ceme-Tube

2.04 MANUFACTURED UNITS
2.05 EQUIPMENT

2.06 COMPONENTS

2.07 ACCESSORIES

A. Form Fasteners

1. Provide nails, spikes, lag bolts, through-bolts and anchorages required, of sufficient strength, length and character to maintain formwork during pouring operations.

B. Form Ties

1. Prefabricated rod, flat band, wire, internally threaded disconnecting type, not leaving metal within 1 1/2-inch of concrete surface.

C. Releasing Agents

1. Provide colorless mineral oil type form coating, non-grain raising and non-staining type, ,
   a. (W.R. Meadows) Duogard –VOC Compliant Form Release Agent
   b. (Nox-Crete) Nox-Crete Form Coating

D. Forming Chamfers and Rustications

1. Provide rigid foam plastic, metal formers, or pre-cut wood profiles in sizes as detailed on drawings.

E. Keyed Construction Joints

1. Provide galvanized steel or extruded plastic tongue and groove type, knock-out holes at 6 inches on centers.

F. Dovetail Anchor Slots

1. Provide minimum 24 gauge galvanized steel foam filled type, with release tape sealed slots, bent tab anchors, securable to formwork.

G. Anchors and Hangers

1. Proved anchors which do not leave exposed metal at surface.

2.08 MIXES

2.09 FABRICATION

2.10 FINISHES

2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.01 INSTALLERS

3.02 EXAMINATION

A. Site Verification of Conditions

1. Prior to commencing work, examine the work of others and verify that such work has been properly completed and installed to allow for proper installation of all materials and methods required of this section.
2. Examine forms in accordance with C.C.R., Title 24, Part 2, Section **1705A.3, and Table 1705A.3**.
3. Do not begin erection until unacceptable conditions have been corrected.

3.03 PREPARATION
3.04 ERECTION

3.05 INSTALLATION
A. Tube Form Erection
1. Place and brace tube forms in accordance with manufacturer's instructions. Forms must be secured at the base and at the top of the form. Additional mid-point bracing may be required for column heights in excess of 12 feet
2. Erect forms at locations and to elevations as indicated on the Drawings.
3. Erect column forms plumb. Bracing must be adequate to maintain plumb of column form throughout pouring and curing of concrete.
4. Avoid damaging interior surface and coating of forms.
5. Waterproof and reinforce openings cut into forms.
6. Do not use forms that are out-of-round, deformed, damaged, or contain defects that could impair concrete surface.
7. Protect forms from rain and snow if work is delayed and forms have been positioned for placing concrete.
8. Place waterproof sheeting over top of forms to prevent damage to interior surface by rain or snow.
9. Do not allow forms to stand in water or snow before placing concrete.

B. Tube Form Concrete Placement
1. Do not place concrete if column forms are wet.
2. Apply form release coating to interior surface.
3. Place concrete at pour rate in accordance with manufacturer's instructions.
4. Do not touch interior surface of forms with vibrator.
5. Do not vibrate concrete from exterior of forms.

C. Tube Form Removal
1. Remove column forms in accordance with manufacturer's instructions.
2. Adhesion of Concrete to Form increases over time. If removal of the form is required, remove as soon as operations will not damage concrete, a minimum of 24 hours and a maximum of 5 days after placing concrete is recommended.
3. Prevent damage to concrete from form removal.

3.06 APPLICATION
3.07 CONSTRUCTION
A. Forming
1. Earthen forms
a. Foundation concrete may be placed directly into neat excavations provided the foundation trench walls are stable

as determined by the Structural Engineer of record, subject to the approval of the Division of the State Architect.

b. The minimum formwork shown on the drawings is mandatory to ensure clean excavations immediately prior to and curing the placing of concrete.

c. Trench earthen forms at least two inches wider than footing widths shown on drawings.

d. Construct wood edge strips at each side of trench at top to secure reinforcing and prevent trench from caving. Form sides of footings where earth caves.

e. Tamp form and clean all debris and loose materials in earthen forms before depositing concrete.

2. Design forms and shoring to resist all anticipated loads.
3. Verify accuracy of lines, levels, and centers.
4. Construct formwork and appurtenances to meet design and code requirements. Construct of sound materials, of correct shape and dimensions, mortar tight and of sufficient strength to prevent sagging, buckling, movement and failures. Provide adequate shores of wood or metal to safely carry imposed loads and adjustable to prevent displacements during the work.
5. Plywood shall be installed with horizontal joints level, vertical joints plumb, aligned, and with joints watertight.
6. Back joints by studs or solid blocking, and fill where necessary for smoothness. Reused plywood shall be thoroughly cleaned, damaged edges or surfaces repaired and both sides and edges oiled with colorless form oil. Nail plywood along edges, and to intermediate supports, with common wire nails spaced as necessary to maintain alignment and prevent warping.
7. Set reinforcing accurately and ensure secure placement.
8. Maintain tolerances of ACI 347R-14 guidelines for surface class:
   a. Class A – Use for all concrete surfaces exposed or concealed.
9. Assist in setting and placing block outs and sleeves for materials and products to be embedded in and passing through concrete. Comply with C.C.R., Title 24 , Part 2, Section 1903A and ACI 318, Section 20.6.
10. Provide ports and openings to facilitate inspection and cleaning.
11. Set screeds and establish levels for tops of concrete for finish surfaces. Shape surfaces as indicated on drawings.
12. Screed supports for concrete over waterproof membranes or vapor retarders should be of a cradle, pad, or base type, which will not puncture membrane.
13. Wet formwork prior to placing concrete and keep wet during concrete curing process.

B. Form Removal

1. Do not remove formwork, shoring, and bracing until such time as masonry and concrete has gained sufficient strength to carry its own weight, and construction and design loads, which are liable to be imposed upon it. Verify strengths by compressive strength test results.
2. Loosen forms carefully. Do not wedge pry bars, hammers or other tools against masonry and concrete surfaces.

3. Comply with ACI 318-19, Section 26.11.2.
4. The following are minimum times for forms and shoring to remain in place prior to removal:
   a. Footings and grade beams - 5 days.
   b. Walls and columns - 14 days.
   c. Beam sides - 10 days.
   d. Beam and slab soffits - 14 days.
5. Cut nails and form ties off flush and leave all surfaces smooth and clean.

3.08 REPAIR/RESTORATION
3.09 RE-INSTALLATION
3.10 FIELD QUALITY CONTROL
A. Site Tests, Inspection
1. Inspect wood forms in accordance with C.C.R., Title 24, Part 2, Section **1705A.3, and Table 1705A.3**.

3.11 ADJUSTING
3.12 CLEANING
3.13 DEMONSTRATION
3.14 PROTECTION
3.15 SCHEDULES

END OF SECTION

SECTION 03 20 00
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  1. Reinforcing bars
  2. Welded Wire Fabric
  3. Chairs and Spacers
  4. Erection of reinforcing
  5. Minimum requirements for concrete coverage
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
  1. 03 10 00 Concrete Forming and Accessories
  2. 03 30 00 Cast-In-Place Concrete
  3. 04 22 00 Concrete Unit Masonry
  4. 32 13 13 Concrete Paving
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES
- A. C.C.R., Title 24, Part 2, Chapter 19A and applicable sections, 2025 edition
- B. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice"
- C. ACI 315 Details and Detailing of Concrete Reinforcement
- D. ACI 318 Building Code Requirements for Structural Concrete
- E. ACI SP-66: ACI Detailing Manual
- F. AWS D1.4 Structural Welding Code – Reinforcing Steel
- G. ASTM A1064 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- H. ASTM A615 Standard Specification for Deformed and Plan Carbon-Steel Bars for Concrete Reinforcement
- I. ASTM A706 Standard Specification for Deformed and Plan Low-Alloy Steel Bars for Concrete Reinforcement

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS
- A. Design Requirements, Performance Requirements
  1. Perform reinforcing work in strict conformance to the Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice"

1.05 SUBMITTALS
- A. Product Data
- B. Shop Drawings
  1. Submit shop drawings in accordance with ACI 315 Details and Detailing of Concrete Reinforcement.
- C. Samples

D. Quality Assurance/Control Submittals
   1. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, Qualification Statements
E. Closeout Submittals
   1. Submit as-built drawings indicating exact locations of reinforcing.

1.06 QUALITY ASSURANCE
A. Qualifications
   1. All shop and fielding welding of reinforcing bars shall be performed by welding operators certified by the American Welding Society (AWS).
B. Regulatory Requirements
   1. Fabrication and placement of reinforcing shall be in accordance with:
      a. C.C.R., Title 24, Part 2, Chapter 19A.
      b. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice", current edition.
      c. AWS D1.4 Structural Welding Code – Reinforcing Steel
      d. ACI 318 Building Code Requirements for Structural Concrete
      e. ACI 315 Details and Detailing of Concrete Reinforcement

C. Certifications
D. Field Samples
E. Mock-ups
F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING
A. Packing, Shipping, Handling, and Unloading
B. Acceptance at Site
C. Storage and Protection
   1. Do not allow reinforcing materials to have direct contact with the ground.
   2. Cover materials adequately to prevent rusting and contact with materials or construction injurious to proper bonding.
D. Waste Management and Disposal

1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS
2.02 EXISTING PRODUCTS

2.03 MATERIALS

A. Reinforcing Bars (All bars shall be deformed)

1. All bars except those to be welded
   a. ASTM A615, Grade 60 unless otherwise noted.
2. All bars to be welded
   a. ASTM A706, Grade 60 unless otherwise noted.
3. Ties and Stirrups
   a. ASTM A615, Grade 60 unless otherwise noted.
4. Welded Wire Fabric
   a. ASTM A1064

2.04 MANUFACTURED UNITS

2.05 EQUIPMENT

2.06 COMPONENTS

2.07 ACCESSORIES

A. Chairs and Spacers

1. Shall be plastic when resting on exposed surfaces
2. Shall be shaped for strength and support for reinforcing.

2.08 MIXES

2.09 FABRICATION

A. Fabricate in accordance with details shown.

B. Accurately bend, cut and place bars as shown on drawings. Bend bars cold; heating of bars is not permissible. Do not bend or straighten bars in any manner that will injure materials. Details for reinforcement shall comply with **ACI 318-19, Chapter 25 and Section 26.6.3.2.**

C. Welding: All welded reinforcing steel shall be ASTM A706. Perform welding, where shown or approved, by the direct electric arc process in accordance with AWS D1.4 using low hydrogen electrodes as indicated on drawings. Preheat 6 inches each side of joint. Protect joints from drafts during cooling process; accelerated cooling is prohibited. Do not tack weld bars. Clean metal surfaces to be welded of all loose scale and foreign materials. Clean welds each time electrode is changed, and chip burned edges before placing welds. When wire brushed, completed welds must exhibit uniform section, smooth welded metal, feather edges without undercuts or overlays, freedom from porosity and clinkers, and good fusion and penetration into the base metal. Cut out welds or parts of welds found defective, with chisel, and replace with proper welding. Comply with Title 24, **Section 1903A.5**.

1. Employ only experienced AWS certified welding operators.
2. Prequalification of welds are to be in accordance with code and carbon equivalent of reinforcing not exceeding 0.75.

2.10 FINISHES

2.11 SOURCE QUALITY CONTROL

A. Tests, Inspection

1. Comply with C.C.R., Title 24, Part 2, **Sections 1903A and 1910A, 2025 edition**

2. Where samples are taken from bundles as delivered from the mill, with the bundles identified as to heat number, and provided the mill analyses accompany the report, then one tensile test and one bend test shall be made from a specimen from each 10 tons or fraction, of each size of reinforcing steel.
3. Where positive identification of the heat number cannot be made or where random samples are to be taken, then one series of tests shall be made from each 2-1/2 tons or fraction, of each size of reinforcing steel.
4. Comply with Title 24, Part 2, C.C.R., **2025** CBC, Chapter **17A** & Section 1910A.2.

B. Verification of Performance

PART 3 EXECUTION

3.01 INSTALLERS

3.02 EXAMINATION

A. Site Verification of Conditions
1. Prior to commencing work of this section, inspect work of others and verify that such work has been properly completed and installed to allow for proper installation of all materials and methods required of this section.

3.03 PREPARATION

3.04 ERECTION

A. Placing
1. Reinforcement shall be placed in accordance with the Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."
2. Each reinforcing bar shall be wired to a cross bar at a maximum spacing of 24-inches on center. Point ends of wire ties away from forms.
3. Provide all accessories necessary to support reinforcing in positions shown on the drawings. Do not use wood or brick to support reinforcing.
4. Where longitudinal reinforcing bars are placed in 2 or more layers, bars in the upper layers shall be placed directly above bars in the bottom layer.

B. Splices and Laps
1. Only splice reinforcing where shown or noted. Splices at other locations must be approved by the structural engineer of record and DSA.
2. Splices in continuous reinforcement as used in walls, wall footings, etc., shall have a Class 'B' lab (1'-6" min.) and the splices in adjacent bars shall be not less than 5'-0" apart.
3. Vertical wall bars shall be spliced at or near floor lines.
4. Bars may be wired together at splices or laps except for top reinforcing of beams and slabs or where specifically detailed to be separated.
5. Welded wire fabric shall be lapped 12-inches minimum.

C. Embedded Elements

1. All dowels, anchor bolts, and other hardware to be set in concrete shall be tied in place prior to placement of concrete.
2. No wet setting, stabbing, rodding, or other movement of embedding items shall be performed during placement of concrete.

D. Bending
1. Bend reinforcing bars cold.
2. All bends within stirrups, hoops, and cross-ties shall engage a longitudinal bar. Provide No. 4 spacer bar where a longitudinal bar is not specifically detailed.

E. Steel shall be kept clean and free of rust

F. Dowels between footings and walls or columns shall be the same grade, size, and spacing as the main reinforcing unless noted otherwise.

G. All bars shall be marked so their identification can be made when the final in place inspection is made.

3.05 INSTALLATION

3.06 APPLICATION

3.07 CONSTRUCTION

A. Concrete Coverage

1. Maintain minimum concrete cover from face of concrete to edge of all reinforcement as follows:

Condition	Cover
Cast against and permanently exposed to earth	3-inches
Formed and exposed to earth or weather:	
- **#6 bars and larger**	2-inches
- **#5 bars and smaller**	1 ½-inch
Unexposed raised slabs and wall faces:	
- **#11 bars and smaller**	¾-inch
Unexposed columns and beams	1 ½-inch
Slabs on grade:	
- **From bottom of slab**	2-inches
- **From top of slab**	1 ½-inch
Other concrete not exposed to weather or earth:	
- **#11 bars and smaller**	1 1/2-inch

3.08 REPAIR/RESTORATION

3.09 RE-INSTALLATION

A. Defective Work

1. The following reinforcing work will be considered defective and may be ordered by Owner to be removed and replaced at no additional expense to Owner.
   a. Bars with kinks or bends not shown on drawings.
   b. Bars injured due to bending or straightening.
   c. Bars heated for bending.
   d. Reinforcement not placed in accordance with drawings or specifications.
   e. Rusty or oily reinforcement.
   f. Re-bent bars.

3.10 FIELD QUALITY CONTROL

A. Site Tests, Inspection

1. Inspection of welding shall be done by a special inspector approved by the Division of State Architect and paid for by the Owner.
2. A minimum of (5) working days prior to pouring concrete, notify the Architect, Structural Engineer, Project Inspector that reinforcing is ready for observation.
3. Secure approvals by testing laboratory and Project Inspector before concrete operations are commenced.

B. Manufacturers' Field Services

3.11 ADJUSTING
3.12 CLEANING
3.13 DEMONSTRATION
3.14 PROTECTION
3.15 SCHEDULES

END OF SECTION

SECTION 03 24 00
SYNTHETIC FIBER REINFORCEMENT

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  - 1. Monofilament PVA fibers used as admixtures to concrete
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
  - 1. 32 13 13 Concrete Paving
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES
- A. ASTM C 94 - Standard Specification for Ready-Mixed Concrete.
- B. ASTM C 1116 - Standard Specification for Fiber-Reinforced Concrete and Shotcrete.

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS

1.05 SUBMITTALS
- A. Product Data
  - 1. Submit manufacturer's product data, application rate, and mixing instructions.
- B. Shop Drawings
- C. Samples
  - 1. Submit manufacturer's sample of synthetic fiber reinforcement
- D. Quality Assurance/Control Submittals
- E. Closeout Submittals

1.06 QUALITY ASSURANCE
- A. Qualifications
  - 1. Synthetic fiber reinforcement manufactured in ISO 9001:2000 certified facility.
  - 2. Minimum 10-year satisfactory performance history of specified synthetic fiber reinforcement.
- B. Regulatory Requirements
  - 1. Synthetic Fiber Reinforcement shall not be a substitute for steel reinforcement where steel reinforcement is specified.
- C. Certifications
- D. Field Samples
- E. Mock-ups
- F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING
- A. Packing, Shipping, Handling, and Unloading
  1. Deliver synthetic fiber reinforcement in manufacturer's original, unopened, undamaged containers and packaging, with labels clearly identifying product name, unique identification number, code approvals, directions for use, manufacturer, and weight of fibers.
- B. Acceptance at Site
- C. Storage and Protection
  1. Store synthetic fiber reinforcement in clean, dry area indoors in accordance with manufacturer's instructions.
  2. Keep packaging sealed until ready for use.
  3. Protect synthetic fiber reinforcement during handling to prevent contamination.
- D. Waste Management and Disposal

1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS
- A. Nycon , 300 Ben Fairless Drive, Fairless Hills, PA 19030 or equal.

2.02 EXISTING PRODUCTS
2.03 MATERIALS
- A. (Nycon) PVA RSC15

2.04 MANUFACTURED UNITS
2.05 EQUIPMENT
2.06 COMPONENTS
2.07 ACCESSORIES
2.08 MIXES
2.09 FABRICATION
2.10 FINISHES
2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.01 INSTALLERS
3.02 EXAMINATION
3.03 PREPARATION
3.04 ERECTION

3.05 INSTALLATION

A. Add synthetic fiber reinforcement to concrete mixture in accordance with manufacturer's instructions and/or recommendations.

B. Application shall be mixed in concrete at a rate of min. 3.5 lbs per cubic yard.

3.06 APPLICATION
3.07 CONSTRUCTION
3.08 REPAIR/RESTORATION
3.09 RE-INSTALLATION
3.10 FIELD QUALITY CONTROL
3.11 ADJUSTING
3.12 CLEANING
3.13 DEMONSTRATION
3.14 PROTECTION
3.15 SCHEDULES

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  1. Cast-In-Place Concrete
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
  1. 03 10 00 Concrete Forming and Accessories
  2. 03 20 00 Concrete Reinforcing
  3. 03 83 00 Temporary Surface Protection
  4. 07 19 00 Water Repellents
  5. 07 26 16 Below-Grade Vapor Retarders
  6. 07 92 00 Joint Sealants
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES
- A. ACI 117 (Latest Edition): Specification for Tolerances for Concrete Construction and Materials
- B. ACI 211.1 (Latest Edition): Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
- C. ACI 301 (Latest Edition): Specifications for Structural Concrete
- D. ACI 302.1R (Latest Edition): Guide to Concrete Floor and Slab Construction
- E. ACI 302.2R (Latest Edition): Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials
- F. ACI 305.1 (Latest Edition): Specification for Hot Weather Concreting
- G. ACI 306.1 (Latest Edition): Standard Specification for Cold Weather Concreting
- H. ACI 309R (Latest Edition): Guide for Consolidation of Concrete
- I. ACI 318-19: Building Code Requirements for Structural Concrete and Commentary
- J. ACI 360R: Guide to Concrete Floor and Slab Construction
- K. ASTM C 150 – Latest Edition, Standard Specification for Portland Cement
- L. C.C.R., Title 24, Part 2, 2025 CBC Chapters 17A Special Inspections and Tests
- M. C.C.R., Title 24, Part 2, 2025 CBC Chapters 19A Concrete

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS
- A. Design Requirements, Performance Requirements
  1. Concrete shall meet the design criteria as indicated on the structural drawings.
  2. Concrete shall be mixed, placed, and cured in accordance with Referenced Standards (1.02 References) and project specifications.

3. The slab-on-grade is not designed to support traffic from cranes or other heavy construction vehicles. Contractor shall repair or replace damaged concrete slabs.

1.05 SUBMITTALS

A. Product Data
   1. Submit manufacturer's product data for admixtures used.
   2. Submit manufacturer's product data for chemical curing compounds used (suspended slabs only).

B. Shop Drawings
   1. Submit Shop Drawings identifying all concrete control and construction joints. Shop Drawings shall include all joint details in section view and referenced to applicable details in Contract Documents.
   2. Shop Drawings must be newly prepared content and shall be drawings to scale. Re-purposing, super-imposing, and/or redacting Contract Documents will not be accepted as Contractor's Shop Drawings.
   2. Shop Drawings shall indicate locations of steel embedded items, block-outs, and any interfacing requirements of other work.

C. Samples
   1. Not required

D. Quality Assurance/Control Submittals
   1. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, Qualification Statements
      a. All mix designs, reports, qualifications shall indicate concrete production facility.
      b. All mix designs, reports, qualifications shall be stamped and signed by a State of California Registered Professional Civil Engineer
      c. Submit the following for each specified mix design:
         1. Statement of Mix Design for Concrete
         2. Indicate cementitious materials, aggregates, and admixtures.
         3. Aggregate gradations.
         4. Compressive Report
         5. Shrinkage Report
         6. Mix Design Qualification
      d. Submit the material standards conformances:
         1. Portland Cement: ASTM C150
         2. Normal Weight Concrete Aggregates: ASTM C33
         3. Light Weight Concrete Aggregates: ASTM C330
         4. Curing Materials: ASTM C171
         5. Water: ASTM C1602

E. Closeout Submittals
   1. Not required.

1.06 QUALITY ASSURANCE

A. Qualifications

1. Provide adequate numbers of skilled personnel who are thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the Work of this Section.

B. Regulatory Requirements
   1. Concrete shall be designed and constructed in accordance with the requirements of ACI 318, CBC Chapter 19A, and project specifications.
   2. Concrete shall be tested and inspected per project specific DSA Statement of Structural Tests and Special Inspections.

C. Certifications

D. Field Samples
   1. Provide on-site sample panels approximately 5-feet x 5-feet for each specified finish. Construct additional panels as may be necessary to gain acceptance of finishes desired. After rejection of any panel, remove from site immediately. Accepted and reviewed panel is to be left in place at site for project duration as a project standard.

E. Mock-ups

F. Pre-installation Meetings
   1. The pre-installation meeting shall include the following representatives: Owner's Representative, Contractor, Architect, Construction Manager, and any other individuals requested by the Owner or Architect.
   2. The pre-installation meeting shall follow ACI 302.1R requirements and recommendations for agenda items outlined in section 3.2 Preconstruction meeting.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling, and Unloading
   1. Not Applicable

B. Acceptance at Site
   1. Not Applicable

C. Storage and Protection
   1. Storage of materials shall be in accordance with ACI 318, 26.5.1.1

D. Waste Management and Disposal
   1. Comply with Local, State, and Federal Laws.

1.08 PROJECT CONDITIONS

1.09 SEQUENCING

1.10 SCHEDULING

1.11 WARRANTY

1.12 SYSTEM STARTUP

1.13 OWNER'S INSTRUCTIONS

1.14 COMMISSIONING

1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Finishing Materials

1. CTS Cement Manufacturing Corp., 12442 Knott St., Garden Grove, CA 92841, or equal.

2.02 EXISTING PRODUCTS

2.03 MATERIALS

A. Base Course
   1. Sand, see Section 31 23 26 Base Course
   2. Gravel, see Section 31 23 26 Base Course

B. Reinforcement
   1. See Section 03 20 00 Concrete Reinforcing

C. Cement
   1. ASTM C150 - Portland Cement, Type II per ACI 318
   2. ASTM C150- Portland Cement, Type II (LWC only)

D. Aggregates
   1. Aggregates found to be potentially reactive shall not be used.
   2. Normal Weight Concrete (NWC): ASTM C33
   3. Light Weight Concrete (LWC): ASTM C330

E. Water
   1. Water used in mixing, curing, and cleaning concrete shall conform to ASTM C1602.

F. Chemical Admixtures
   1. Use as required and only with the written acceptance of the Architect or Structural Engineer.
   2. Admixtures shall be in accordance with ACI 318, 26.4.1.5.1
   3. Coloring Admixtures shall be in conformance with ASTM C979
      a. Job-proportioning or job-mixing of material for monolithic colored surfaces is not permitted.
      b. Shall be lime-proof and contain no calcium chloride.
      c. Color: As selected by Architect.

G. Concrete Curing Materials (Suspended Slabs Only)
   1. Wet Burlap
      a. New burlap: AASHTO M182, ASTM C171
   2. Plastic Film, Waterproof Paper, Combination Polyethylene/burlap Sheets
      a. Moisture loss of no more than 0.055 g/cm^3 in 72 hours per ASTM C156.
      b. Waterproof paper shall conform to ASTM C171.

2.04 MANUFACTURED UNITS

2.05 EQUIPMENT

2.06 COMPONENTS

2.07 ACCESSORIES

A. Forming and Accessories
   1. See Section 03 10 00 Concrete Forming and Accessories

B. Temporary Surface Protection
   1. See Section 03 83 00 Temporary Surface Protection

C. Joint Materials
   1. See Section 07 92 00 Joint Sealants

D. Below-Grade Vapor Retarders
   1. See Section 07 26 16 Below-Grade Vapor Retarders

E. Below and Above Grade Waterproofing

1. See Section 07 13 26 Self-Adhering Sheet Waterproofing

2.08 MIXES
A. General
1. Concrete Mixing Operations shall conform to ASTM C94
2. Aggregate
a. Use the largest maximum aggregate size for the conditions. Reference ACI 211.1 (Latest Edition) for aggregate gradation.
3. Water
a. Slab-On-Grade Construction
1. Total water per yard: 285 Lbs.
b. Foundation Construction
1. Total water per yard: 300 Lbs.
B. Compressive Strength
1. Provide concrete mixes which will yield the minimum 28-day compressive strengths required and shown on drawings.
C. Slump
1. Provide concrete mixes which will meet the required slump(s) as indicated on the drawings.
D. Design Mix: Mix design shall be in accordance with se ACI 318, 26.4.3.1

2.09 FABRICATION
2.10 FINISHES
A. Finishing Materials
1. Sacking
a. (CTS) Wunderfixx Concrete Smoothing Compound
2. Water Repellents
a. See Section 07 19 00 Water Repellents

2.11 SOURCE QUALITY CONTROL
A. Tests, Inspection
1. Concrete shall be tested and inspected per project specific DSA Statement of Structural Tests and Special Inspections.
B. Verification of Performance

PART 3 EXECUTION

3.01 INSTALLERS
3.02 EXAMINATION
A. Evaluation and Acceptance of Concrete
1. In accordance with ACI 318, 26.12

3.03 PREPARATION
A. Preparation of equipment and place of deposit
1. In accordance with ACI 318, 26.5, 26.6, 26.11

3.04 ERECTION
3.05 INSTALLATION
A. Below-Grade Vapor Retarders
1. See Section 07 26 16 Below-Grade Vapor Retarders

3.06 APPLICATION

3.07 CONSTRUCTION

A. Formwork
   1. In accordance with ACI 318, 26.11
   2. See Section 03 10 00 Concrete Forming and Accessories

B. Mixing
   1. In accordance with ACI 318, 26.5

C. Conveying
   1. In accordance with ACI 318, 26.5

D. Depositing
   1. In accordance with ACI 318, 26.5

E. Curing
   1. In accordance with ACI 318, 26.5.3
   2. **Slabs-On-Grade: Ponding or Immersion Method**
      a. In accordance with ACI 308.1, Section 4 for a minimum of (168) consecutive hours.
      b. Immediately after concrete placement, prior to commencement of ponding, continuously keep concrete in moist condition, maintain specified concrete temperatures, and protect concrete from mechanical injury for the duration of the initial and final curing periods.
      c. Start ponding on the concrete surface as soon as possible without marring the surface. Ponding shall commence no later than 12 hours after initial placement of concrete.
      d. Replace water lost due to evaporation or leakage at a rate sufficient to maintain the pond. The pond shall maintain a minimum depth of 1-inches A.F.F. of water at all times during the curing process. Any deviations will require a reset of curing time (168 hours).
      e. Protect the concrete slab from damaging mechanical disturbances during the curing period (168 hours). Protect finished surfaces from damage by construction equipment, materials or methods, and from damage caused by application of curing procedures, or by running water.
   3. **Suspended Slabs: Moisture Retention Method**
      a. In accordance with ACI 308.1,

F. Cold Weather Requirements
   1. In accordance with ACI 318, 26.5.4

G. Hot Weather Requirements
   1. In accordance with ACI 318, 26.5.5

H. Tolerances
   1. Floor Flatness and Levelness

Slabs On Grade (In accordance with ACI 302.1R-15 Table 10.15.3a)

FLOOR FINISH	COMPOSITE FLATNESS (F_F)	COMPOSITE LEVELNESS (F_L)
Epoxy Coatings, Thick Set Tile,	35	25
Carpet	35	25
Thin set Tile, Sheet Flooring, Resinous Flooring,	35	25

Wood Flooring, Burnished/Polished Concrete		

Suspended Slabs (In accordance with ACI 302.1R-15 Table 10.15.3b)

FLOOR FINISH	COMPOSITE FLATNESS (F_F)	COMPOSITE LEVELNESS (F_L)
Epoxy Coatings, Thick Set Tile	35	25
Carpet	35	25
Thin set Tile, Sheet Flooring, Resinous Flooring, Wood Flooring, Burnished/Polished Concrete	35	25

I. Formwork Removal
   1. In accordance with ACI 318, 26.11.2.1

J. Embedment's
   1. In accordance with ACI 318, 20.6, 26.8

K. Construction Joints
   1. In accordance with ACI 318, 26.5.6
   2. In accordance with Construction Documents.

L. Finishing
   1. Sacking
      a. In accordance with manufactures installation procedures.
   2. Water Repellents
      a. See section 07 19 00 Water Repellents

3.08 REPAIR/RESTORATION

3.09 RE-INSTALLATION

3.10 FIELD QUALITY CONTROL

A. Site Tests, Inspection
   1. Concrete shall be tested and inspected per project specific DSA Statement of Structural Tests and Special Inspections.

B. Manufacturers' Field Services

3.11 ADJUSTING

3.12 CLEANING

3.13 DEMONSTRATION

3.14 PROTECTION

A. Temporary Surface Protection
   1. See Section 03 83 00 Temporary Surface Protection

3.15 SCHEDULES
A. Finishing
   1. Sacking
      a. Typical all vertical surfaces exposed to view.
   2. Water Repellents
      a. Typical all walls, all exterior surfaces

END OF SECTION

SECTION 04 22 00
CONCRETE UNIT MASONRY

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Concrete Masonry Units (CMU)
   2. Mortar
   3. Grout
   4. Admixtures
   5. Reinforcement and Metal Accessories
   6. Flashing Materials (Embedded)
   7. Miscellaneous Masonry Accessories

B. Products Supplied But Not Installed Under This Section

C. Products Installed But Not Supplied Under This Section

D. Related Sections
   1. 07 19 00 Water Repellents

E. Allowances

F. Unit Prices

G. Measurement Procedures

H. Payment Procedures

I. Alternates

1.02 REFERENCES

A. TMS 602-22: Specification for Masonry Structures

B. TMS 402-22: Building Code Requirements for Masonry Structures and Commentary.

C. ASTM A36/A36M: Standard Specification for Carbon Structural Steel

D. ASTM A82/A82M: Standard Specification for Steel Wire, Plain, for Concrete Reinforcement

E. ASTM A153/A153M: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

F. ASTM A185/A185M: Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete

G. ASTM A307: Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength

H. ASTM A615/A615M: Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

I. ASTM A641/A641M: Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

J. ASTM A653/A653M: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process

K. ASTM A884/A884M: Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Fabric for Reinforcement

L. ASTM A899 Standard Specification for Steel Wire Epoxy-Coated

M. ASTM A951/A951M: Standard Specification for Masonry Joint Reinforcement

N. ASTM A1008/A1008M: Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

O. ASTM C90 Standard Specification for Loadbearing Concrete Masonry Units

P. ASTM C140/C140M: Standard Test Method for Sampling and Testing Concrete Masonry Units.
Q. ASTM C150/C150M: Standard Specification for Portland Cement
R. ASTM C270: Standard Specification for Mortar for Unit Masonry
S. ASTM C476: Standard Specification for Grout for Unit Masonry
T. ASTM C1019: Standard Test Method for Sampling and Testing Grout
U. ASTM C1586: Standard Guide for Quality Assurance of Mortars
V. ASTM C1714/C1714M: Standard Specification for Preblended Dry Mortar Mix for Unit Masonry.
W. ASTM D2000: Classification System for Rubber Products in Automotive Applications.
X. ASTM D2287: Standard Specification for Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS

A. Design Requirements, Performance Requirements
   1. Provide materials to achieve the net compressive strength of concrete unit masonry equal to or greater than 2000 psi f'm or as indicated on structural drawings. Structural drawings take precedence.
   2. Concrete unit masonry shall conform to ASTM C90 medium weight.

1.05 SUBMITTALS

A. General
B. Product Data
   1. Submit manufacturer's product data sheet for each product used.
C. Shop Drawings
   1. Submit comprehensive Shop Drawings for all concrete unit masonry work. Shop Drawings shall indicate the specific layout, dimensions, coursing, profiles, sizes, and reinforcement details for each wall.
   2. Shop Drawings shall include the following content:
      a. Plan view, Section views, and Elevations views coordinated with project datums (i.e. Top of Masonry (TOM), Top of Footing (TOF), and Bottom of Footing (BOF) elevations.
      b. Unit arrangement, placement/location of special units, unit colors, unit face textures, and locations of expansion joints, and details for flashing, anchors, and embedded items.
   3. Shop Drawings shall be newly prepared content, drawn to scale.
   4. Shop drawings shall indicate surrounding construction as provided for the Project.
   5. Project's Contract Drawings will not be accepted as Shop Drawings.
D. Samples
   1. Submit samples for verification for the following:
      a. Each type and color of concrete masonry units used.
      a. Each type and color of mortar used.
E. Quality Assurance/Control Submittals
   1. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, Qualification Statements
      a. Submit Mix Design Test Reports for the following:
         1. Preblended Mortar: In conformance with ASTM C270

2. Conventional Grout: In conformance with ASTM C476

b. Submit material certificates for each of the following certifying compliance:
   1. Concrete masonry units
   2. Steel reinforcing bars
   3. Anchor, ties, fasteners, and metal accessories.
   4. Preformed control joint gaskets.

F. Closeout Submittals

1.06 QUALITY ASSURANCE

A. Qualifications
   1. Preconstruction Testing
      a. Owner will select a qualified independent testing agency to perform preconstruction testing indicated below.
      b. The compressive strength of masonry shall be determined based on the strength of the unit and type of mortar specified (Unit Strength Method) per **CBC 2105A and Section 1.4B.2.b of TMS 602-22.**
      c. Concrete Masonry Units: Test per ASTM C140.
      d. Grout: Test per ASTM C1019

B. Regulatory Requirements

C. Certifications

D. Field Samples

E. Mock-ups
   1. Construct and approximate 4’-0” wide by 4’-0” high panel for representation of completed masonry, joint tooling, design details, and workmanship. All specified units shall be incorporated into mock-up.
   2. Mock-up shall be removable and not part of the final product.
   3. Mock-up approval by Architect shall be required prior to commencement of Concrete Unit Masonry Work.

F. Pre-installation Meetings
   1. Conduct conference at project site prior to start of Work in this section.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling, and Unloading

B. Acceptance at Site

C. Storage and Protection
   1. All materials of this section shall be protected to maintain quality and physical requirements.
   2. All masonry units shall be stored on the jobsite so that they are protected from rain, stored off-ground and kept clean from contamination. Prevent units from being otherwise wetted.
   3. Store preblended mixes in manufacturer’s original, unopened, undamaged containers with identification labels intact, covered and protected from weather.

D. Waste Management and Disposal

1.08 PROJECT CONDITIONS
- A. Project Environmental Requirements
  - 1. General
    - a. Cover top of unfinished masonry work to protect it from weather.
  - 2. Cold-Weather Procedures
    - a. When ambient temperatures falls below 40 degrees F or the temperature of masonry units is below 40 degrees F, wet or frozen units shall not be laid.
    - b. Implement cold weather construction procedures in accordance with **TMS 602-22,** Article 1.8C.
  - 3. Hot-Weather Procedures
    - a. When ambient temperatures exceeds 100 degrees F, or exceeds 90 degrees F with a wind velocity greater than 8 mph, implement hot weather construction procedures in accordance with **TMS 602-22,** Article 1.8D.
- B. Existing Conditions

1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS
- A. Concrete Masonry Units
  - 1. ORCO Block & Hardscape, 11100 Beach Blvd., Stanton, CA 90680
- B. Preblended Mortar and Grout
  - 1. ORCO Blended Products, 27347 Third Street, Highland, CA 92346, or Equal.
  - 2. E-Z Mix, Inc., 3355 Industrial Drive, Bloomington, CA 92316
- C. Admixtures
  - 1. R-Crete Inc., P.O. Box 80286, Rancho Santa Margarita, CA 92679, or Equal.
  - 2. E-Z Mix, Inc., 3355 Industrial Drive, Bloomington, CA 92316
  - 3. Sika Corporation, 201 Polito Ave., NJ 07071

2.02 EXISTING PRODUCTS
2.03 MATERIALS
- A. Preblended Mortar: ASTM C270, Type S
  - 1. (ORCO) OPB Masonry Mortar
    - a. Color: (ORCO) Otay Brown

B. Grout: ASTM C476
   1. (ORCO) OPB Masonry Grout 70/30 2000 psi
   2. (E-Z Mix) PMP Spec Concrete 2000
      a. Aggregate proportions shall comply with admixture manufacturer requirements.
      b. Grout shall contain an expanding, water reducing, retarding admixture listed in paragraph D.
      c. Grout shall not contain fly ash.
      d. Grout slump shall be designed to 8" maximum, or less as required by admixture manufacturer.

C. Water: Potable

D. Admixtures: Grout shall contain grout-aid as specified below. The use of any other admixture shall not be permitted unless approved by the Structural Engineer of Record and DSA.
   1. (R-Crete) R-Grout Aid (GA213)
   2. (E-Z Mix) Pre-Mix Products Grout Additive
   3. (Sika) Grout-Aid

E. Reinforcement and Metal Accessories
   1. General
      a. Metal reinforcement and accessories shall conform to **TMS 602-22,** Article 2.4
   2. Steel Reinforcing Bars: ASTM A615/A615M, Grade 60
   3. Anchors, Ties, and Accessories:
      a. Plate and bent-bar anchors: ASTM A36/A36M
      b. Sheet metal anchors and ties: ASTM A1008/A1008M
      c. Wire mesh ties: ASTM A185/A185M
      d. Wire ties and anchors: ASTM A82/A82M
      e. Headed bolt anchors: ASTM A307, Grade A
   4. Coatings for Corrosion Protection
      a. Mill galvanized coatings
         1. Joint reinforcement: ASTM A641, 0.1 oz/ft2
         2. Sheet metal anchors and ties: ASTM A653, 1.50 oz/ft2
      b. Hot-dipped galvanized coatings
         1. Joint reinforcement, wire ties, and wire anchors: ASTM A153, 1.50 oz/ft2
         2. Sheet metal anchors and ties: ASTM A153, Class B
      c. Epoxy coatings
         1. Joint reinforcement: ASTM A884, Class A, Type 1, > 7 mils.
         2. Wire ties and anchors: ASTM A899, Class C, 20 mils.
         3. Sheet metal anchors and ties: 20 mils per manufacturer's specification.

2.04 MANUFACTURED UNITS

A. Concrete Masonry Units: ASTM C90
   1. Weight Classification: Medium Weight
   2. Size: 8″x 8″x16″
   3. Color: (Orco) Black 250
   4. Texture: Shot-Blast
   5. Score: n/a

B. Concrete Masonry Lintel Units: ASTM C90
   1. Weight Classification: Medium Weight
   2. Size: 8″x 8″x8″
   3. Color: (Orco) Black 250
   4. Texture: Shot Blast
   5. Score: n/a

C. Concrete Masonry Unit Caps: ASTM C90
   1. Weight Classification: Medium Weight
   2. Size: 8″x 4″x16″
   3. Color: (Orco) Black 250
   4. Texture: Shot Blast
   5. Score: n/a
   6. Bevel: n/a

2.05 EQUIPMENT

2.06 COMPONENTS

2.07 ACCESSORIES

A. Joint Gaskets
   1. Rubber Preformed Control Joint Gaskets: ASTM D2000, Designation M2AA-805
   2. PVC Preformed Control Joints Gaskets: ASTM D2287, Type PVC

2.08 MIXES

A. Mortar
   1. Mix preblended factory mix per manufacturer's instructions.

B. Conventional Grout
   1. Mix grout to a consistency that has a slump between 8 and 11-inches per **TMS 602-22,** Article 2.6B, or per admixture manufacturer's requirements.

2.09 FABRICATION

A. Shop Assembly
   1. Fabricate reinforcement per **TMS 602-22,** Article 2.7 A.

2.10 FINISHES

A. Finishing Materials
   1. Water Repellents
      a. See Section 07 19 00 Water Repellents

2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.01 INSTALLERS

3.02 EXAMINATION

A. Site Verification of Conditions

1. Prior to the start of masonry installation, verify all conditions pertinent to the performance of work in this Section are acceptable.
2. Verify foundations are constructed with tolerances conforming to requirements of ACI 117.
3. Verify the reinforcing dowels are positioned in accordance with project drawings.
4. Masonry work shall not proceed until unsatisfactory conditions have been addressed.

3.03 PREPARATION

A. Protection

B. Surface Preparation

1. Clean reinforcement and shanks of anchor bolts by removing mud, oil, or other materials that will adversely affect bond to mortar or grout.
2. Reinforcement with rust and/or mil scale is acceptable provided attributes of a cleaned sample are in accordance with the applicable ASTM specification.
3. Prior to laying masonry, remove laitance, loose aggregate, and any other material that would prevent mortar from bonding to the foundation.
4. Do not wet units before laying, unless otherwise required. Wet cutting is permitted.
5. Cut units as required to fit; use motor-driven masonry saw. Install cut units with cut surfaces concealed as much as possible.

3.04 ERECTION

3.05 INSTALLATION

A. Masonry Units

1. Unit Selection
   a. Select and arrange units for exposed masonry to produce a uniform blend of colors and textures.
   b. Mix units from several pallets or cubes as they are placed.
2. Construction Tolerances
   a. Comply with tolerances in **TMS 602-22**, Article 3.3G.
   b. All units shall be laid true, level, plumb, and in accordance with the Contract Documents and Approved Shop Drawings.
3. Construct grout spaces free of mortar dropping, debris, and any material deleterious to grouting.
4. Ensure all vertical cells to be grouted are aligned and unobstructed openings for grout are provided in accordance with project drawings.
5. Clean-Outs
   a. Construct cleanouts in the bottom course of masonry for each grout pour when the grout pour height exceeds 5-feet 4-inches.

b. Create cleanout by cutting off entire face shell of unit. Replace face shell after inspection and before grouting.
c. Brace cleanout closure to resist grout pressure.
d. Space cleanouts horizontally a maximum 32-inches on center.

6. Unit Pattern
   a. Masonry shall be laid in '**RUNNING**' bond pattern.
   b. Brace masonry during construction to assure stability. Contractor is responsible for designing, providing, and installing temporary bracing.

B. Mortar Bedding and Jointing
1. Place mortar in accordance with **TMS 602-22**, Article 3.3 B.
2. Initial bed joint shall not be less than ¼-inch nor more than ¾-inch.
3. All head and bed joints, except Initial bed joints, shall be a nominal 3/8-inch thick, unless otherwise noted.
4. Thickness of bed joints shall not exceed 5/8-inch.
5. Lay units with head and bed joints filled with mortar for the thickness of the face shell.
6. Remove mortar protrusions extending ½-inch or more into cells to be grouted.
7. Fully mortar webs in all courses of piers, columns, and pilasters, in the starting course on foundations, and when necessary to confine grout.
8. All mortar joints on exposed walls shall be concave, unless otherwise indicated, and struck to produce a dense, slightly concave surface well bonded to the surface of the masonry unit.
   a. Exceptions:
      1. Mortar joints at units to receive ceramic tile shall be struct flush.
      2. Mortar joints at units to receive 2-coat Portland cement plaster finish shall be struct flush.
      3. Mortar joints at scored units shall be struct flush and follow score flutes salient and reentrant corners.
9. Remove and re-lay in fresh mortar any unit that has been disturbed to the extent the initial bond is broken.

C. Embedded Items and Accessories
1. Construct control joints as detailed in the drawings as masonry progresses.
2. Install preformed control-joint gaskets designed to fit standard sash block.
3. Construct chases as masonry units are laid.
4. Install pipes and conduits passing though masonry walls as units are laid.
5. Install and secure connectors, flashing, weep holes, weep vents, nailing blocks, and other accessories as required.

D. Installation of Reinforcing Steel, Wall Ties, and Anchors
1. Install reinforcing steel, wall ties, and anchors in accordance with **TMS 602-22**, Article 3.4.
2. Place reinforcement as detailed on the drawings.
   a. Support and fasten reinforcement to prevent displacement beyond specified tolerances during construction and grouting operations.

b. Maintain clear distances between reinforcement and any face of masonry unit or formed surface, but not less than ½-inch for course grout.
c. Completely embed reinforcing bars in grout.
d. Embed joint reinforcement with minimum 5/8-inch cover to faces exposed to weather or earth, and ½-inch elsewhere.
e. Provide minimum 6-inch lap splices and ensure that all ends of longitudinal wires are embedded in mortar at laps.
f. Tolerances for placement of reinforcing bars in walls and flexural elements shall be +/- ½-inch when the distance from the centerline of reinforcing bars to the opposite face of masonry, d, is equal to 8-inches or less +/- 1 ¼-inch for d greater than 24-inches.
g. Foundation dowels that interfere with unit webs are permitted to be bent to a maximum of 1-inch horizontally for every 6-inches of vertical height.

3. Install wall ties as detailed on the drawings and in accordance with **TMS 602-22**, Article 3.4 C.
4. Install anchor bolts as detailed on the drawings and in accordance with **TMS 602-22**, Article 3.4 E.
   a. Embed headed and bent-bar anchor bolts in grout.
   b. Maintain clear distance between anchor bolts and any face of masonry unit or formed surface of at least ½-inch.
   c. Maintain a clear distance between parallel anchor bolts not less the diameter of the anchor bolt, nor less than 1-inch.

E. Grouting
1. Comply with grout placement requirements in **TMS 602-22**, Article 3.5.
2. Fill all cells with grout.
3. Place gout within 90 min. from introducing water in the mixture and prior to initial set.
4. Discard field-mixed grout does not meet specified slump without adding water after initial mixing.
5. For transit-mixed grout:
   a. Addition of water is permitted at time of initial discharge to adjust consistency to a slump between 8 and 11-inches.
   b. Discard transit-mixed grout that does not meet specified slump without adding water, other than as allowed in initial discharge adjustment.
   c. Transit-mixed grout may be used beyond the time limit as long as it meets the specified slump.
6. Grout pour height
   a. Do not exceed maximum gout pour height as given in **TMS 602-22**, Table 7, or as otherwise specified.
7. Grout lift height:
   a. Maximum grout lifts shall not exceed 4-feet
8. Grout consolidation:
   a. Consolidate grout pours 12-inches or less by mechanical vibration.
   b. Consolidate grout pours exceeding 12-inches by mechanical vibration and reconsolidate after initial water loss and settlement has occurred.

c. Shaking or rodding rebar is not allowed.

9. Grout Keys
   a. Required between grout pours, or between lifts when the previous lift is permitted to set prior to placement of the subsequent lift.
   b. Form grout key by terminating the grout a minimum of 1 ½-inch below a mortar joint.
   c. Do not form grout keys within beams.
   d. At beams or lintels laid with closed bottom units, terminate the grout pour at the bottom of the beam or lintel without forming a grout key.
10. Pointing and Cleaning
   a. Point and tool holes in mortar joints to produce a uniform, tight joint.
   b. Minimize any mortar or grout stains on the wall. Immediately remove any staining or soiling that occurs.
   c. For precision or textured units, except as noted below, clean masonry by dry brushing before tooling joints
   d. For burnished, glazed, or pre-finished concrete masonry units, immediately remove any green mortar smears or soiling with a damp sponge.

F. Control Joints
1. Provide vertical control joints in CMU walls.
2. Unless otherwise noted, vertical joints shall occur at 24-foot on-center spacing maximum along wall length, at floor or roof joints, wall height changes, and 24-inchs minimum past one side of openings greater than 6-feet wide.

G. Finishing
1. Water-Repellents
   a. See Section 07 19 00 Water Repellents

3.06 APPLICATION

3.07 CONSTRUCTION

3.08 REPAIR/RESTORATION

3.09 RE-INSTALLATION

3.10 FIELD QUALITY CONTROL

A. Site Tests, Inspection
1. Inspection tasks and frequency shall be performed in accordance with the Statement of Special Inspections CBC Section 1704A.3 and DSA Form 103.
2. Tests
   a. Unless indicated otherwise, perform one set of tests for each 5000 sq. ft. of wall area or portion thereof.
   b. Concrete Masonry Units: Test per ASTM C140
   c. Mortar and Grout Test: At the beginning of work, sample mortar and grout at one-week intervals per **CBC Section 2105A.3.**
      1. Mortar: ASTM C1586
      2. Grout: Test per ASTM C1019
3. Masonry Core Test:
   a. Core and test per **CBC Section 2105A.4** from locations selected by the Architect.

1. Minimum (2) cores for each 5,000 square feet of masonry wall area, or portion thereof.

B. Manufacturers' Field Services

3.11 ADJUSTING

3.12 CLEANING

A. Final Cleaning

1. After mortar is thoroughly set and cured, clean exposed masonry surfaces of stains, efflorescence, mortar or grout droppings, and debris as follows:
   a. Clean exposed CMU walls with a light sandblast. All non-masonry work near the area to be sandblasted shall be covered or protected before the sandblasting starts. Care shall be taken to avoid contamination to areas that are not to be sandblasted.
   b. Burnished, glazed, or pre-finished concrete masonry units shall be protected from sandblast operations.
2. At completion of masonry work, remove all scaffolding and equipment used during construction, and remove all debris, refuse, and surplus masonry material from the site.

3.13 DEMONSTRATION

3.14 PROTECTION

3.15 SCHEDULES

END OF SECTION

SECTION 05 05 13
SHOP-APPLIED METAL FINISHES

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  1. Shop-Applied PVDF Finishes for metal work
  2. Shop-Applied Anodized Finishes for metal work
  3. Shop-Applied Powder Coat Finishes for metal work.
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
  1. 05 12 00 Structural Steel Framing
  2. 05 50 00 Metal Fabrications
  3. 07 62 00 Sheet Metal Flashing and Trim
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES
- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
- B. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Architectural Extrusions and Panels.
- C. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Architectural Extrusions and Panels.
- D. ASTM B449 - Standard Specification for Chromates on Aluminum.
- E. ASTM D1730 - Standard Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting.
- F. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
- G. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS

1.05 SUBMITTALS
- A. General
- B. Product Data
  1. Submit manufacturer's descriptive data and test results for specified finishes.
  2. Submit manufacturer's RAL color wheel for custom color selection.
- C. Shop Drawings
- D. Samples
  1. Submit Samples minimum size 2"x 3-1/2" coating samples showing selected colors on aluminum backing.
- E. Quality Assurance/Control Submittals

1. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, Qualification Statements
    a. Submit manufacturer's certification that finishes applied on Project components comply with referenced AAMA standards.

F. Closeout Submittals
1. Submit manufacturer's maintenance data information regarding touch-up, cleaning, and maintenance of finishes.

1.06 QUALITY ASSURANCE

A. Qualifications
1. Applicator shall be certified by AAMA and listed on AAMA Verified Components List.

B. Regulatory Requirements
1. Applicator - PVDF-Based Finishes:
    a. Use regenerative thermal oxidizer to destroy VOC's.
    b. Utilize chrome-based five-stage pretreatment system applied in accordance with AAMA and ASTM standards.
    c. Possess in-house blending capabilities, allowing for only specific amount of paint needed for each project.
    d. Utilize automated rotary atomization spray bell application providing uniform coverage with manual spray reinforcement for coverage in areas unreachable by automation.
    e. Employ skilled professional field service division to repair warranty or application issues arising at Project site.
    f. Utilize documented quality control protocol in accordance with AAMA 2605 test procedures.
    g. Apply AAMA 2605 compatible water-based air-dry system.
2. Applicator - Anodize Finishes:
    a. Offer both caustic (traditional) and eco-friendly (acid) etching technologies.
    b. Utilize fully automated, computer-controlled process lines for consistency throughout Project.
    c. Utilize documented quality control protocol in accordance with AAMA 611 test procedures :

C. Certifications

D. Field Samples

E. Mock-ups

F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling, and Unloading
1. Apply manufacturer's standard protective coverings to finished surfaces.
2. Deliver, store, and handle finished components in manner to prevent damage to finishes.
3. Furnish touch-up paint along with each material shipment.

B. Acceptance at Site

C. Storage and Protection

D. Waste Management and Disposal

1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
A. Furnish manufacturer's 10-year warranty providing coverage that PVDF coatings:
1. Will not chip, crack or peel (lose adhesion) but this does not include minute fracturing which may occur in proper fabrication of building parts.
2. Will not chalk in excess of ASTM D4214 Number 8 rating, determined by procedure outlines in ASTM D4214.
B. Furnish applicator's 10-year warranty providing coverage that anodized coatings:
1. Will resist cracking, crazing, flaking, and blistering if forming and welding are completed prior to finishing; post-forming or welding voids warranty.
2. Will not chalk in excess of ASTM D4214 Number 8 rating, determined by procedure outlined in ASTM D-4214.
3. Will not change color more than five Delta-E Hunter units (square root of the sum of square Delta L, Delta a, and Delta b) as determined by ASTM D2244, Method 6.3. Fading or color changes may not be uniform if surfaces are not equally exposed to sun and elements.

1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS
2.02 EXISTING PRODUCTS
2.03 MATERIALS
2.04 MANUFACTURED UNITS
2.05 EQUIPMENT
2.06 COMPONENTS
2.07 ACCESSORIES
2.08 MIXES
2.09 FABRICATION
2.10 FINISHES
A. Shop Priming, Shop Finishing
1. PVDF-Based Coating
a. AAMA 2605, fluoropolymer finish containing minimum 70 percent PVDF resins, two coat system, custom RAL color as selected by Architect.
2. Anodize Finish

a. AAMA 611, Architectural Class I anodized to 0.0007-inch minimum thickness, color to selected by Architect from the following colors: clear, champagne, light bronze, medium bronze, dark bronze, extra dark bronze, black, copper.

3. Powder Coat Finishes
   a. AAMA 2604, modified polyester resins, custom RAL color as selected by Architect.

2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.01 INSTALLERS
3.02 EXAMINATION
3.03 PREPARATION
3.04 ERECTION
3.05 INSTALLATION
3.06 APPLICATION
3.07 CONSTRUCTION
3.08 REPAIR/RESTORATION
3.09 RE-INSTALLATION
3.10 FIELD QUALITY CONTROL
3.11 ADJUSTING
   A. Touch up minor scratches and abrasions in finishes in accordance with finish manufacturer's instructions; replace components having damage that cannot be successfully touched up.

3.12 CLEANING
   A. Clean finished surfaces after installation in accordance with finish manufacturer's instructions.

3.13 DEMONSTRATION
3.14 PROTECTION
3.15 SCHEDULES

END OF SECTION

SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 – GENERAL

1.01 SUMMARY
- A. Provide structural framing members, complete with required bracing, weld washers, nuts, shims, anchor bolts, and baseplates.
- B. Shop Priming
- C. Hot-Dip Galvanizing

1.02 RELATED WORK SPECIFIED IN OTHER SECTIONS

1.03 CODES AND STANDARDS
- A. Refer to the following for information regarding materials and installation methods necessary:
  1. American Society for Testing and Materials - Specifications A36, A53-B, A153, A570, A307, A370 and A500, A501 (also listed on **Structural Drawings)** A446, A611, A572 and A992.
  2. American Institute of Steel Construction, **Steel Construction Manual, 16th Edition.**
  3. American Welding Society - **AWS D1.1 –20** and **AWS D1.8-21** Seismic Supplement
  4. Steel Structures Painting Council.
  5. Title 24, Part 2, C.C.R., **2025** C.B.C.
  6. **AISC 341-22** Seismic Design Manual.

1.04 SUBMITTALS
- A. Shop drawings and product data shall be submitted in compliance with the pertinent provisions of the General Conditions and Section 01 33 00.
- B. Submit shop and erection drawings prior to fabrication. Prepare erection drawings by State registered structural engineer. Show welded connections, lengths of welds, profiles, sizes, spacing and locations of all members, attachments, anchorages, framed openings size and type of fasteners, cambers and land loads. Contractor is responsible for dimensions on shop drawings.
  1. Splices and deviations: Splices will be permitted only where and as shown on drawings. Deviations from design drawings are to be handled by Construction Change Document (CCD) and require approval of the structural engineer and the Division of the State Architect.
- C. Erection and bracing plan and procedure: Refer to Section 1710, Title 8, CCR. Employ a state licensed civil engineer to prepare erection and bracing plan and erection procedure for structural steel including columns, beams, and girders, who will be responsible for compliance. Follow plan and procedure exactly. Keep a copy at project site.

1.05 TESTS AND INSPECTIONS
- A. If structural steel can be identified by heat or melt numbers and is accompanied by mill analysis and test reports per **Section 2201A.2**, testing shall be in accordance with **Section 1705A.2**, Title 24. Identified stock shall be tested also.

B. If structural steel cannot be identified or its source is questionable, all steel must be tested for tension and bending for each shape and size.
C. Furnish test specimens from steel fabricator and take them under the direction of the Testing Agency. Machine each test specimen by Testing Agency to dimensions required by ASTM A370.
D. Have Testing Agency pick up test specimens and make required tests.
E. Costs of tests of identified stock will be paid for by Owner, unless tests fail to comply with the specifications, in which case Owner will back-charge the contractor.
F. Complete a SIX-sided inspection of all steel. Owner will pay for such inspection unless structural steel is not fabricated within twenty-five miles of the project site, in which case Owner will back-charge the contractor.
G. After fabrication and inspection, costs associated with re-inspection of defective or replaced materials will not be the responsibility of the Owner.
H. Provide all labor, equipment and facilities necessary for moving and handling materials to be inspected.
I. Cost for supervision by a registered inspector of all welding operations, including inspection for quality, penetration, and conformity of drawings, and a report verifying that welding is adequate and was done in conformity of all project requirements will be paid for by Owner. Sections **1701A.4 and 1705A.2.1,** Title 24, CBC.
    1. Visually inspect all welds and inspect grouting of column base plates.
J. Comply with **Sections 2216A.1 and 2216A.2**, Title 24.
K. Shop fabrication inspections per **Section 1704A.2.5.**

1.06 PROJECT CONDITIONS
A. Verify measurements, lines, grades, locations and details at project site. Conform to existing actual field conditions.

PART 2 – PRODUCTS

2.01 MATERIALS AND COMPONENTS
A. Structural Steel Members: Type for general construction, weldable steel, conforming to requirements of ASTM A36, A36/A572, or A992 as per plans, and as required, shop primed or galvanized where left exposed to elements of weather. Title 24, **2201A.3 and 2202A,1**.
B. Structural Pipe: Provide ASTM A53, (Type E or S) or A501.
C. Tube Steel: Provide ASTM A500 Grade B Type, Fy=46 ksi.
D. Cast Steel: Provide in accordance with A27.
E. Machine Bolts: ASTM A307
F. High strength bolts: **ASTM A325 or ASTM A490.**
G. Comply with Title 24, Section **2202A**.
H. Anchor Rods: As specified on drawings.

2.02 LIGHT STRUCTURAL STEEL
A. Standard Specifications for Flat-Rolled Carbon Steel Sheets of Structural Quality, ASTM A570 or A611, A446
B. Standard Specifications for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing, ASTM A36 and A501, or Cold Formed Tubing, ASTM A500, Grade B

2.03 WELDING ELECTRODES

A. Steel: Conform to **AWS D1.1-20** and Section **2201A.4**, Title 24, Classification E70 series as required for rigid frames the electrodes shall meet Charpy V-notch 20 ft. lbs. At minus 20 **degrees** F. For welding of 'LFRS', electrodes must meet Charpy V-Notch toughness of 40 ft-lb at 70 degrees F.

B. Stainless Steel: Conform to **ANSI/AWS A5.9 &ASME SFA 5.9 ER 316LSi.** E309L Electrodes, AISC Design Guide 27 Section 9.2, Table 9-1

2.04 GALVANIZING

A. Provide hot-dip galvanizing in accordance with ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products., ASTM A153 (small parts), and ASTM A767 (reinforcing steel – rebar).

2.05 PRIMER

A. Shop Primer (All Structural Steel Members)

1. Tnemec, Inc., 123 West 23 Avenue North, Kansas City, MO 64116
   a. Series 94-H20 Hydro-Zinc MCU (Exposed Steel Members)
   b. Series 115, UNI-BOND DF (Concealed Steel Members)

2.06 OTHER MATERIALS

A. Provide other materials, not specifically described or indicated but required for a complete and proper installation, as selected by Contractor subject to acceptance by Engineer.

PART 3 – EXECUTION

3.01 SURFACE CONDITIONS

A. Prior to commencing work of this section, inspect the work of others and verify that such work has been properly completed and installed to allow for proper installation of all materials and methods required of this section.

3.02 FABRICATION AND ERECTION

A. Fabricate and assemble work with skilled personnel using sizes and weights shown. Connections are to be as detailed, unless approved otherwise beforehand. Allow no splices except where shown.

1. Ultrasonic material inspection - ultrasonically test column materials thicker than 1-1/2 inch for laminations within 1 foot (6 inches either side) of a direct groove weld from girder flange connections and column splices.
2. Rigid frames: Fabrication welding and erection of rigid frames.
   a) The fabricator shall provide fabrication/erection inspector to oversee the fabrication, welding and erection of the rigid frames. This inspector is in addition to the District's verification inspector.
   b) A welding procedure specification, prepared in accordance with AWS requirements, shall be submitted to the project structural engineer and project inspector.

B. Drilling, Punching and Reaming: Hole burning to make or enlarge previous holes is not allowed. Prepare required holes in structural steel members for attachment or passage or work of other trades. Where allowed, steel may be punched 1/16 inch larger than the nominal diameter of the bolt when thickness of the steel is equal to or less than the diameter of the bolt plus 1/8 inch. Where the steel is thicker than the diameter of the bolt plus 1/8 inch, the holes must be drilled or sub-punched and reamed. Diameter of the sub-punched holes, and the drill for sub-drilled holes, is to be 1/16 inch smaller than the nominal diameter of bolt to be installed. Precisely locate finished holes to ensure passage of all bolts through steel assemblies without drifting. Enlarge holes only by reaming. Poor matching of holes is cause for rejection of work.

C. Welding: Perform welding by the electric shielded arc process. Cut out defective welds with a chisel. Clamp or hold materials securely in position for welding. Upon completion, remove slag and clean welds for inspections and painting. All groove and multi-pass welds are required to be continuously inspected. Welding shall conform to T-24, **2201A.4**.

1. Storage and care of electrodes - Ensure that coatings of low hydrogen type electrodes are thoroughly dry when used. Use electrodes taken from hermetically sealed packages within 4 hours of the time the package is opened. Electrodes not used within this time period, and electrodes which have been exposed more than one hour to air having a relative humidity of 75 percent or greater, are to be dried for at least 2 hours at 200 to 250 degrees F. before used, or are to be reconditioned according to manufacturer's printed recommendations. Electrodes dried or reconditioned which are not used within 4 hours after drying is completed are to be re-dried before use. Electrodes of any classifications that have been wet are not to be used under any conditions.
2. Preparation - Clean surfaces to be welded, or paint, grease, scale, and foreign matter. Clean welds each time electrode is changed. Chip entire area of hand-guided and controlled flame cut edges before welds are deposited. In general, surfaces made by automatic or mechanically guided and controlled equipment need not be ground or chipped before welded.
3. Procedures - During assembling and welding, hold components of a built-up member with sufficient clamps or other adequate means to keep parts straight and in close contact. Do no welding in wind until adequate protective screening has been set up. Cut out defective welds or parts of welds with chisel or air arc and replace.
4. Characteristics of welds - After being deposited, brush welds and ensure they exhibit uniform section, smoothness of weld metal, feather edges without undercuts or overlays, and freedom from porosity and clinkers. Ensure through visual inspection at edges and ends of fillet welds there is good fusion and penetration into base metal.

D. Bolting

1. Common bolts - make connections with common bolts only where indicated. (ASTM A307 Bolt.)
2. High strength steel bolting - where structural joints are made using high strength bolts, hardened washers, and nuts tightened to a high tension, the materials, method of installation and tension

control, types of wrenches to be used, and inspection methods are to conform to specifications for structural jointing using ASTM F3125, Grade A325 or Grade A490 bolts established by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation and the following requirement:

a. Provide high strength bolts with a suitable identifying mark placed on top of the head before leaving factory.
b. Do tightening of nuts with properly calibrated wrenches or turn of nut method; the minimum bolt tension for the size of bolt used is to be in accordance with tables listed in the above standards and as required by AISC in the presence of the special inspector.
c. Check calibrated wrenches individually for accuracy at least once daily for actual condition of application.
d. Mark bolts that have been completely tightened with identifying symbol.
e. Install hardened washers in accordance with AISC specifications.
f. Ensure that contact bearing surfaces and threads of bolted parts are free of scale, slag, and burrs which could prevent solid seating of parts.
g. Bolt lengths are to be grip plus 1-1/4 inch.

3. Load indicator washers - provide as manufactured/licensed by Cooper and Turner, or Bethlehem Steel. They may be used for field installation of high-strength bolts. These washers may not be substituted for any required washer, but may be used in conjunction with required washers. Tightening is to be in accordance with these specifications using high strength bolts. After sufficient bolts in a joint are snugged to draw the members into close contact, tightening should progress from the most rigid part to the free edges until the load indicators on all bolts are closed to the required gap of 0.015 inches under bolt heads or 0.005 inches under the load indicator at half of the gaps or as required per manufacturer. To prevent over tightening and damage to the bolts, do not completely close the gap.
4. For alternatives to load indicator washers, see structural drawings.

E. Erection

1. Erect structural steel by professional riggers, using proper hoists and equipment, carefully planned and laid out so that cutting will not be necessary. Erect the work plumb, square and true to line. Provide temporary bracing and guys where necessary to provide for loads and stresses to which the structure may be subjected, including those due to erection equipment and its operation, and leave in place as long as necessary to safeguard all parts of the work.
2. Temporary connections - securely bolt work to maintain the steel in proper position while bolting and welding is being performed. Align, plumb and level all work prior to welding and final bolting.
3. Set column base plates in exact position as to alignment, level and elevation and support on steel wedges or equivalent until grout has properly set. Center of each base is to be true to the column center

within 1/16 inch and adjusted to its elevation to 1/32 inch. Exactly level plates on both axis.

4. Sequence - carry out the erection of steel in the proper sequence with the work of others. Frame, bed and anchor to concrete and related work in accordance with detailed drawings and setting diagrams.
5. Erection tolerance in accordance with AISC's "Code of Standard Practice for Steel Buildings and Bridges."
6. Perform erection with suitable equipment, of adequate capacity and design with due regard for personnel and public safety and as not to deflect or stress members beyond reasonable limits. Maintain erection and temporary bracing plan at project site in accordance with Title 8, CAC.
7. Damaged members - during erection, straighten or replace members which are bent, twisted or damaged as directed. If heating is required in straightening, perform heating by methods which ensure uniform temperatures throughout entire member. When directed, remove members which are not damaged to an extent impairing their appearance, strength or serviceability and replace with new members at no additional cost to Owner and must have DSA approval.
8. Anchor bolts - provide with setting drawings and instructions. Verify position of bolts prior to delivery of steel; report errors or deviation for adjustment.

F. Erection Bracing: Provide erection bracing immediately upon erection of members and leave in place until all members are braced by balance of building.

G. Protection of Floors and Temporary Flooring:
   1. Exercise caution to protect floor surfaces and adjacent work from damages. Do not overload floors. Provide only pneumatic tired mobile equipment for moving steel. Do not place steel members directly on concrete floors; use pads, or timbers, or other materials for cushioning.
   2. Provide necessary planking, scaffolding and temporary flooring in connection with erection of steel or support of erection machinery as part of the work. Conform use of temporary floors or steel deck to governing codes and regulations.
   3. Temporarily tack weld steel deck to supports where used as a working platform. Distribute concentrated loading from welding machines or other heavy machinery by planking or other equivalent means. Replace steel deck damaged by using as working platform at no additional cost to Owner.

H. Shop Priming:
   1. General
      a. All steel members shall be shop primed.
         1. Exceptions:
            a. When Steel is embedded in concrete or grouted masonry.
            b. When steel is scheduled/noted to receive a hot-dipped galvanized coating/finish.
            c. When steel is stainless steel.

d. When steel is scheduled/noted to receive shop applied finishes, such as PVDF Coatings, powder coatings, etc.

2. Shop Priming
   a. Surface Preparation: All members shall be clean, dry, and free of oil, grease, and other contaminants. All surfaces shall achieve:
      1. All Exposed Steel Members: Minimum SSPC-SP6 NACE 3 Commercial Blast Cleaning
      2. All Concealed Steel Members: Minimum SSPC-SP3 Power Tool Cleaning
   b. Coverage Rates: Film thickness shall be a minimum of 2.5 Mils dry film thickness.
   c. Field Touch Ups: As required, surface preparation, coverage rates to match shop applied application.
3. Application Schedule
   a. All exterior steel members: Tnemec Series 94-H20 Hydro-Zinc or equal.
   b. All interior steel members: Tnemec Series 115 Uni-Bond DF or equal
4. Intermediate and Top Coats:
   a. See Section 09 91 13 Exterior Painting
   b. See Section 09 91 23 Interior Painting

I. Hot-Dip Galvanizing:
1. General In accordance with ASTM A123 (general iron and steel products), ASTM A153 (small parts), and ASTM A767 (reinforcing steel – rebar).
2. Surface Preparation
   a. Prior to galvanizing, all members shall be clean, dry, and free of the following:
      1. Weld slag and other welding flux residues
      2. Weld splatter and anti-splatter
      3. Burrs (could include excessively rough edges from flame cutting)
      4. Very heavy or extremely adherent mill scale
      5. Mill coatings such as varnishes or lacquers
      6. Epoxies, vinyl, and asphalt
      7. Sand and other impurities on castings
      8. Oil-based paints and markers
      9. Crayon markers
      10. Very heavy or thick deposits of wax or grease
   b. Field Touch-Ups, Field Repair of Damaged and Uncoated Area
      1. In accordance with ASTM A780, Application of Zinc-Rich Paint.
      2. Surface Preparation shall comply with the following SSPC surface preparation specifications and practices for the following surface contaminations:
         a. Hot-Dip Galvanizing Touch Ups
            1. Power Tool Cleaning to Bare Metal (SSPC-SP11)

3. Application of coating shall commence immediately after surface preparation.
4. Coating shall be applied by low pressure compressor-type spray or airless type spray. Spray can application will not be accepted.
5. The coatings shall be applied at sufficient wet film thickness to achieve a minimum dry film as recommended by the manufacturer, using manufacturers recoat time directions.
6. Apply coatings in strict conformance with manufacturer's application instructions.
7. Touch-up any areas where coat has been damaged in accordance with manufacturer's recommendations.
8. Min. of (2) two coats are required. Top coating is not permitted.

3. Application Schedule
   a. When steel is scheduled (noted on drawings) to receive a hot-dipped galvanized coating/finish.

3.03 TEST AND INSPECTION
- A. Tests of Structural and Cold Formed Steel - **1705A.2**
- B. Welding – **1705A.2.7**
- C. H.S. Bolts –table 1705A.2.1 and **2216A.1**
- D. End Welded Studs – **1705A.2 and 2216A.2**
- E. Shop Fab – **1704A.2.5** and **1705A.2**

3.04 CLEANING
- A. Clean site after work of this section.
- B. Remove weld splatters

END OF SECTION

SECTION 05 31 00
STEEL DECKING

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  - 1. Steel Decking
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
  - 1. 05 12 00 Structural Steel Framing
  - 2. 05 50 00 Metal Fabrications
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS
- A. Design Requirements, Performance Requirements
  - 1. Steel deck panels used as a component of horizontal or sloped floor and roof systems supporting vertical loads, in-plane diaphragm shears, and in-plane axial loads.
  - 2. Steel deck panels used as a component of metal fabricated gates and fences.

1.05 SUBMITTALS
- A. General
- B. Product Data
  - 1. Submit manufacturer's product data for each product specified.
- C. Shop Drawings
  - 1. Submit shop and erection drawings prior to fabrication. Prepare erection drawings by State registered structural engineer. Show welded connections, lengths of welds, profiles, sizes, spacing and locations of all members, attachments, anchorages, framed openings size and type of fasteners, and land loads. Contractor is responsible for dimensions on shop drawings.
- D. Samples
- E. Quality Assurance/Control Submittals
  - 1. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, Qualification Statements

1.06 QUALITY ASSURANCE

1.07 DELIVERY, STORAGE, AND HANDLING

1.08 PROJECT CONDITIONS

1.09 SEQUENCING

1.10 SCHEDULING

1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS
- A. Verco Decking, Inc., 4340 North 42nd Ave., Phoenix, AZ, 85019, or Equal.

2.02 EXISTING PRODUCTS
2.03 MATERIALS
- A. Steel Decking
  - 1. Acoustical Dovetail Deck
    - a. (Verco) Type HSB-36, IAPMO UES ER-2018
      1. Height: 1-1/2-inch
      2. Gauge: 16
      3. Acoustical Perforations: No
      4. Acoustical Spacers: No
      5. Fiberglass Acoustical Insulation: No

2.04 MANUFACTURED UNITS
2.05 EQUIPMENT
2.06 COMPONENTS
2.07 ACCESSORIES
2.08 MIXES
2.09 FABRICATION
2.10 FINISHES
- A. Shop Priming, Shop Finishing
  - 1. Steel Decking: Shop Prime White over Galvanized coating, G90.

2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.01 INSTALLERS
3.02 EXAMINATION
3.03 PREPARATION
3.04 ERECTION
3.05 INSTALLATION
- A. Install in accordance with IAPMO UES Evaluation Report Numbers listed for each deck specified.
- B. Install in accordance with Contract Documents and approved Shop Drawings.

3.06 APPLICATION
3.07 CONSTRUCTION
3.08 REPAIR/RESTORATION
3.09 RE-INSTALLATION
3.10 FIELD QUALITY CONTROL

3.11 ADJUSTING
3.12 CLEANING
3.13 DEMONSTRATION
3.14 PROTECTION
3.15 SCHEDULES

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Miscellaneous metal fabrications including but not limited to:
      a. Angles
      b. Plates
      c. Sheet goods
      d. Fencing Members and Gates Members
      e. Rails
      e. Handrails
      f. Guardrails
      g. Steel Coatings (Shop-Applied Primer, Hot Dipped Galvanized Coatings)

B. Products Supplied But Not Installed Under This Section

C. Products Installed But Not Supplied Under This Section

D. Related Sections
   1. 05 05 13 Shop-Applied Metal Finishes
   2. 05 12 00 Structural Steel Framing
   3. 09 91 13 Exterior Painting
   4. 09 91 23 Interior Painting

E. Allowances

F. Unit Prices

G. Measurement Procedures

H. Payment Procedures

I. Alternates

1.02 REFERENCES

A. AISC Manual of Steel Construction, Latest Edition

B. ASTM A36: Standard Specification for Carbon Structural Steel

C. ASTM A53: Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless

D. ASTM A108: Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished

E. ASTM A123: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

F. ASTM A307: Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength

G. ASTM A475: Standard Specification for Zinc-Coated Wire Strand

H. ASTM A500: Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

I. ASTM A501: Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing

J. ASTM A513: Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing

K. ASTM A563: Standard Specification for Carbon and Alloy Steel Nuts

L. ASTM A569: Standard Specification for Steel, Carbon, (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial Quality

M. ASTM A653: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
N. ASTM A992: Standard Specification for Structural Shapes
O. ASTM A1008: Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
P. ASTM A1011: Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
Q. ASTM F1554: Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
R. ASTM A312: Standard Specification for Seamless, Welded, and Heavy Cold Worked Austenitic Stainless Steel Pipes
S. ASTM A314: Standard Specification for Stainless Steel Billets and Bars for Forging
T. ASTM A480: Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip
U. ASTM A554: Standard Specification for Welded Stainless Steel Mechanical Tubing
V. ASTM B108: Standard Specification for Aluminum-Alloy Permanent Mold Castings
W. ASTM B209: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
X. ASTM B221: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
Y. SSOC-PA 1, Shop, Field, and Maintenance Painting of Steel
Z. AWS D1.1 Structural Welding - Steel

1.03 DEFINITIONS
A. AISC: American Institute of Steel Construction
B. SSPC: The Society for Protective Coatings
C. AWS: American Welding Society

1.04 SYSTEM DESCRIPTIONS
A. Design Requirements, Performance Requirements
1. Design, fabrication, and erection of steel shall conform to the specifications and standards of the AISC, as contained in the latest edition of the “AISC Manual of Steel Construction.”

1.05 SUBMITTALS
A. General
B. Product Data
1. Submit product data for manufactured items.
2. Submit product data for primers and finishes.
C. Shop Drawings
1. Submit fabrication shop drawings for all metal fabrications. Shop drawings to indicate materials, dimensions, anchoring and terminations.

2. Shop Drawings for ornamental steel gates shall identify total gate leaf weight (with all accessories attached) and welding procedures for all welds.

D. Samples
1. Where other than mill finishes are specified, provide samples of specified finish.

E. Quality Assurance/Control Submittals
1. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, Qualification Statements

F. Closeout Submittals

1.06 QUALITY ASSURANCE

A. Qualifications
1. All metal fabrications shall meet the material/grade as specified.
2. All welders shall have evidence of passing the AWS standard qualification tests and shall be certified for the work they are performing.

B. Regulatory Requirements
1. Top of gripping surfaces of handrails shall be 34″ minimum and 38″ maximum vertically above walking surfaces, stair nosing, and ramp surfaces. Handrails shall be at a consistent height above such surfaces.
2. Clearance between handrail gripping surfaces and adjacent surfaces shall be 1-1/2″ minimum. Handrail may be located in a recess if the recess is 3″ maximum deep and 18″ minimum clear above the top of the handrail.
3. Handrail gripping surfaces shall be continuous along their length and shall not be obstructed along their tops or sides. The bottoms of handrail gripping surfaces shall not be obstructed for more than 20% of their length. Where provided, horizontal projections shall occur 1-1/2″ minimum below the bottom of the handrail gripping surfaces.
4. Handrail gripping surfaces with a circular cross section shall have an outside diameter of 1-1/4″ minimum and 2″ maximum.
5. Handrail gripping surfaces with a non-circular cross section shall have an outside dimension of 4″ minimum and 6-1/4″ maximum, and a cross-sectional dimension of 2-1/4″ maximum.
6. Handrail gripping surfaces and any surfaces adjacent to them shall be free of sharp or abrasive elements and shall have rounded edges.
7. Handrails shall not rotate within their fittings.
8. Handrails gripping surfaces shall extend beyond and in the same direction of stair flights and ramp runs in accordance with **CBC Section 11B-505.10**. Such extensions are not required for continuous handrails at the inside turn of switchback or dogleg stairs and ramps.
9. The orientation of at least one handrail shall be in the direction of the stair run, perpendicular to the direction of the stair noising, and shall not reduce the minimum required width of the stair. **CBC Section 11B-505.2.1.**

10. A 2″ minimum high curb or a barrier shall be provided to prevent the passage of a 4″ diameter sphere rolling off the sides of a ramp surface. Such a curb or a barrier shall be continuous and uninterrupted along the length of the ramp. **CBC Section 11B-405.9.2.**

C. Certifications
D. Field Samples
E. Mock-ups
F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING
A. Packing, Shipping, Handling, and Unloading
B. Acceptance at Site
C. Storage and Protection
1. Store metal fabrications items above grade on platforms, skids, or other supports.
D. Waste Management and Disposal

1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Shop Primer
1. Tnemec, Inc., 123 West 23 Avenue North, Kansas City, MO 64116.
B. Hot-Dip Galvanized Field Repair
1. ZRC Worldwide, 145 Enterprise Drive, Marshfield, MA 02050 or Equal.

2.02 EXISTING PRODUCTS
2.03 MATERIALS
A. Steel
1. Plates: ASTM A36
2. Bars: ASTM A36
3. Bars (Cold-Finished): ASTM A108
4. Tubing (Hot-Formed Welded and Seamless): ASTM A501
5. Tubing (Cold-Formed Welded and Seamless): ASTM A500, Grade B
6. Tubing (Mechanical): ASTM A513
7. Sheets (Hot-Rolled): ASTM A1011, A569
8. Sheets (Cold-Rolled): ASTM A1008
9. Sheets (Galvanized): ASTM A653, G90
10. Pipes: ASTM A500, Grade B, Sched. 40 unless noted otherwise
11. Bolts, Studs, Threaded Rods: ASTM A307
12. Nuts: ASTM A563
13. Wire Strand: ASTM A475, Min. Common grade, Class B zinc coating

B. Stainless Steel Alloy, Type 302/304
   1. Sheet: ASTM A480
   2. Pipe: ASTM A312
   3. Mechanical Tube: ASTM A554
   4. Bars: ASTM A314

C. Aluminum, 6061-T4 alloy
   1. Extruded Bars: ASTM B221
   2. Extruded Rods: ASTM B221
   3. Extruded Wire: ASTM B221
   4. Extruded Profiles: ASTM B221
   5. Extruded Tubes: ASTM B221, 6063-T6 alloy
   6. Sheets: ASTM B209
   7. Plates: ASTM B209
   8. Castings: ASTM B108, 214 alloy

2.04 MANUFACTURED UNITS

2.05 EQUIPMENT

2.06 COMPONENTS

2.07 ACCESSORIES

2.08 MIXES

2.09 FABRICATION

A. General
   1. Fabrication of steel shall conform to the specifications and standards of the AISC, as contained in the latest edition of the "AISC Manual of Steel Construction."
   2. All connections not show shall be submitted on the shop drawings for review prior to fabrication.
   3. Verify actual filed dimensions prior to any fabrication.
   4. Fabricate items with joints neatly fitted and properly secured.
   5. Fit and shop assemble in largest practical sections for delivery to site.
   6. Make exposed joints flush butt type hairline joints where mechanically fastened.
   7. Supply components required for proper anchorage of metal fabrications. Fabricate anchorage and related components of same material and finish as metal fabrication, unless otherwise specified or shown.

B. Exposed Mechanical Fastenings
   1. Flush countersunk screws or bolts unobtrusively located, consistent with design of structure, except where specifically noted otherwise.

C. Welding
   1. Perform shop welding in accordance with AWS D1.1.
   2. Exposed welds shall comply with AISC Code of Standard Practice, Section 10

2.10 FINISHES

A. Shop Priming, Shop Finishing
   1. Shop Primer (Exposed Steel Members): (Tnemec) Series 94-H20 Hydro-Zinc MCU
   2. Shop Primer (Concealed Steel Members): (Tnemec) Series 115 Uni-Bond DF

3. Hot-Dip Galvanizing: ASTM A123, A153, A767

B. Field Touch Ups, Field Repairs
1. Shop Primer- (Tnemec) Series 94-H20 Hydro-Zinc MCU (Exposed)
2. Shop Primer – (Tnemec) Series 115 Uni-Bond DF (Concealed)
2. Field Repair to Galvanizing: (ZRC) Cold Galvanizing Compound

2.11 SOURCE QUALITY CONTROL
A. Tests, Inspection
1. Shop Welding
a. Welds are to be inspected by a qualified special inspector.
b. Inspections will be paid for by Owner.
B. Verification of Performance

PART 3 EXECUTION

3.01 INSTALLERS
3.02 EXAMINATION
A. Site Verification of Conditions
1. Examine surfaces and work in place by others and verify that such work is in conditions appropriate to receive work of this section. Do not apply or install work of this section until unsatisfactory work of others is in a condition which will ensure the correct installation of materials and products of this section.

3.03 PREPARATION
3.04 ERECTION
3.05 INSTALLATION
A. All metal fabrications shall be installed plumb, true to line, square and level, accurately fitted and free from distortion and defects.
B. Temporary bracing shall be installed and shall be left in place until other means is provided to adequately brace the fabrication.
C. Obtain approval of Architect prior to site cutting or making adjustments which are not part of intended work or are not shown on shop drawings.
D. Make provisions for erection stresses by temporary bracing. Keep work in alignment.
E. Replace items damaged during installation.
F. Perform field welding in accordance with AWS D1.1.
G. After installation, touch-up field welds and scratched and damaged paint, or coated surfaces. Use primer consistent with shop finish.
H. Supply and assist with setting all items requiring to be cast into concrete, or embedded in masonry, complete with necessary setting templates.

3.06 APPLICATION

A. Shop Priming:

1. General

a. All steel members shall be shop primed.

1. Exceptions:

a. When Steel is embedded in concrete of grouted masonry.

b. When steel is scheduled/noted to receive a hot-dipped galvanized coating/finish.

c. When steel is stainless steel.

d. When steel is scheduled/noted to receive shop applied finishes, such as PVDF Coatings, powder coatings, etc.

2. Shop Priming

a. Surface Preparation: All members shall be clean, dry, and free of oil, grease, and other contaminants. All surfaces shall achieve:

1. All Exposed Steel Members: Minimum SSPC-SP6 NACE 3 Commercial Blast Cleaning

2. All Concealed Steel Members: Minimum SSPC-SP3 Power Tool Cleaning

b. Coverage Rates: Film thickness shall be a minimum of 2.5 Mils dry film thickness (DFT).

c. Field Touch Ups: As required, surface preparation, coverage rates to match shop applied application.

3. Intermediate and Top Coats:

a. See Section 09 91 13 Exterior Painting

b. See Section 09 91 23 Interior Painting

B. Hot-Dip Galvanizing:

1. General: In accordance with ASTM A123 (General Iron and steel products), ASTM A153 (small parts), and ASTM A767 (reinforcing steel – rebar).

2. Surface Preparation

a. Prior to galvanizing, all members shall be clean, dry, and free of the following:

1. Weld slag and other welding flux residues

2. Weld splatter and anti-splatter

3. Burrs (could include excessively rough edges from flame cutting).
4. Very heavy or extremely adherent mill scale.
5. Mill coatings such as varnishes or lacquers
6. Epoxies, vinyl, and asphalt
7. Sand and other impurities on castings
8. Oil-based paints and markers
9. Crayon markers
10. Very heavy or thick deposits of was or grease.

b. Field Touch-Ups, Field Repair of Damaged and Uncoated Area:
1. In accordance with ASTM A780, Application of Zinc-Rich Paint.
2. Surface Preparation shall comply with the following SSPC surface preparation specifications and practices for the following surface contaminations:
a. Hot-Dip Galvanizing Touch Ups
1. Power Tool Cleaning to Bare Metal (SSPC-SP11)
3. Application of coating shall commence immediately after surface preparation.
4. Coating shall be applied by low pressure compressor-type spray or airless type spray. Spray can application will not be accepted.
5. The coatings shall be applied at sufficient wet film thickness to achieve a minimum dry film as recommended by the manufacturer, using manufacturers recoat time directions.
6. Apply coatings in strict conformance with manufacturer's application instructions.
7. Touch-up any areas where coat has been damaged in accordance with manufacturer's recommendations.
8. Min. of (2) two coats are required. Top coating is not permitted.

3. Application Schedule
a. When steel is scheduled (noted on drawings) to receive a hot-dipped galvanized coating/finish.

3.07 CONSTRUCTION
3.08 REPAIR/RESTORATION
3.09 RE-INSTALLATION
3.10 FIELD QUALITY CONTROL
A. Site Tests, Inspection
1. Field Welding
a. All welding/welds shall be inspected by a qualified special inspector.
b. Inspections will be paid for by Owner.

3.11 ADJUSTING
3.12 CLEANING

3.13 DEMONSTRATION
3.14 PROTECTION
3.15 SCHEDULES

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  1. Provide the work specified herein consisting of miscellaneous wood framing, sheathing, nails, bolts, screws, framing anchors and other rough hardware and needs for construction as indicated on the drawings for complete and proper installation.
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
  1. 06 17 00 Shop-Fabricated Structural Wood
  2. 06 18 00 Glued-Laminated Construction
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES
- A. C.C.R., Title 24, Part 2, Chapter 23, 2025 Edition
- B. PS 20 - American Softwood Lumber Standard.
- C. American Wood Council, National Design Specifications for Wood Construction, Current Edition and Supplements.
- D. West Coast Lumberman's Bureau
- E. American Plywood Association
- F. Western Wood Products Association Grading Rules
- G. ASTM D245 – Current Edition, Standard Practice for Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS

1.05 SUBMITTALS

1.06 QUALITY ASSURANCE
- A. Qualifications
  1. Use adequate numbers of skilled personnel who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.
- B. Regulatory Requirements
  1. Hardwood plywood, particleboard, and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure (ATCM) for Composite Wood (17 C.C.R. 93120 et. seq.). Those materials not exempted by the ATCM must meet the specified emission limits as shown in C.C.R., Title 24, Part 11, Table 5.504.4.5 Formaldehyde Limits
- C. Certifications

1. Provide lumber with visible grade stamp of an approved agency certified by NFPA.
2. Redwood shall be graded by the California Redwood Association, Redwood Inspection Service

D. Field Samples
E. Mock-ups
F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING
A. Packing, Shipping, Handling, and Unloading
1. Exercise care in off-loading lumber to prevent damages splitting and breaking.
2. Deliver materials at earliest date possible to allow maximum drying time on site.
B. Storage and Protection
1. Store materials at job site in a safe area, out of traffic and shored up off ground surface.
2. Identify framing lumber by grades and store grades separately from each other.
3. Protect products with adequate waterproofing.
4. Pile and strip lumber at site to allow free circulation of air with pile protected from sun and moisture.

1.08 PROJECT CONDITIONS
A. Project Environmental Requirements
1. Air-season all lumber for at least 60 days before covering with finish materials.
2. Moisture Content of sawn lumber shall not exceed 19-percent when framing starts, and sheathing is applied. Any noncompliant work shall be rejected and reframed with acceptable lumber
B. Existing Conditions

1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Fire-Retardant-Treated Wood
1. Hoover Treated Wood Products, Inc., 154 Wire Rd., Thomson, GA 30824 or Equal.

2.02 EXISTING PRODUCTS
2.03 MATERIALS
A. Dimensional Lumber
Unless notes otherwise on Structural Drawings:
1. Non-Load Bearing Studs, minimum DF#2
2. Top Plates, minimum DF#2
3. Sill Plates, preservative treated (PT), minimum DF#2
4. Blocking, minimum DF#2
5. Furring, minimum DF#2
6. Bracing, minimum DF#2
7. Joists, Rafters, Purlins, minimum DF#1
8. Beams and Posts, minimum DF#1
9. Load Bearing Studs < 15', minimum DF#2
10. Load Bearing Studs >15', minimum DF#1

B. Plywood Sheathing
Unless noted otherwise on Structural Drawings:
1. Exterior Stud Wall Sheathing, 15/32" APA Rated, Exposure -1
2. Roof Sheathing, 15/32" APA Rated, Exposure-1
3. Floor Sheathing, 3/4" T&G APA Rated, Exposure-1

C. Fire-Retardant-Treated Plywood Sheathing – Telecom Backboards
1. (Hoover) PYRO-GUARD FRT plywood, ¾" thick

2.04 MANUFACTURED UNITS
2.05 EQUIPMENT
2.06 COMPONENTS
2.07 ACCESSORIES
A. Nails, spikes, and staples: Common (with standard lengths), except as otherwise indicated, galvanized nails at sill plates for exterior locations, high humidity within conditioned spaces, and treated wood: plain finish for other interior locations; size and type to suit application.
B. Steel hardware and stock framing connectors: ASTM A36 steel, galvanized for exterior applications, Simpson, or other approved manufacturer. Use of manufactured connectors other than specific brand and catalog no. shown on plans requires DSA approval.
C. Lag bolts and wood screws: ANSI/ASME Standards B18.2.1 and B18.6.1.
D. Machine bolts: ASTM A307.
E. Wood preservative: Wolmanizing treatment at least two weeks prior to delivery to site.

2.08 MIXES
2.09 FABRICATION
2.10 FINISHES
2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION
3.01 INSTALLERS
3.02 EXAMINATION

A. Site Verification of Conditions

1. Carefully select all members. Ensure that exposed members are free of heart center. Select members so that knots and obvious defects will not interfere with placement of bolts, proper nailing or making proper connections, and not impair achievement of proper finished appearances where to be exposed.
2. Cut out and discard defects which will render a piece unable to serve its intended function. Lumber may be rejected by architect, structural engineer, or project inspector whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.

3.03 PREPARATION

3.04 ERECTION

3.05 INSTALLATION

3.06 APPLICATION

3.07 CONSTRUCTION

A. General Framing

1. In addition to framing operations normal to fabrication and erection indicated on drawings. Install all wood backing for plaster screeds and control joints required for other work of other trades, and for casework, chalkboards, toilet partitions, etc. as required.
2. Set all horizontal and sloped members with crown up.
3. Non-bearing, non-shear stud walls, sills, and trimmers may be anchored to concrete with shot pins only as and where indicated on drawings. Use bolts set in concrete when edge distance at concrete is less than 3 inches. No shot pins permitted at curb conditions.
4. All wall and partition studs and mullions shall be continuous from sill to plates. Unless indicated otherwise, run at least two studs on each side of openings in stud walls for openings in exterior walls and in partition openings larger than 6 feet, and partitions from sill to plate. For additional details and larger openings, see structural drawings.
5. Double plates with all joints staggered and lapping at least four feet, and splice to bear on studs at splice joints. See Structural Drawings.
6. Install nailing blocks and backing necessary for attachment of grounds, finishes, trim, fixtures, and do all required cutting, furring, and backing for electrical, plumbing and heating pipes, fixtures, etc.
7. Frame stud partitions, furring and walls containing fire cabinets, electric panels, plumbing, heating, or other pipes to give proper clearance. Cutting of studs in bearing walls and shear walls is prohibited unless specifically detailed.
8. Fur walls for all pipes over 3/4" dia. Do not place pipes exceeding 1/3 of plate width in partitions used as bearing or plywood sheathed walls, but place them in furring completely clear of studs, unless detailed otherwise. Place approved piping in center of plates using neat hole. No notching is allowed. In no case allow pipes to pass through plates less than 5-1/2 inches wide.

9. Unless otherwise indicated, provide 2-inch by 6-inch studs at 16 inches on centers.
10. Provide cross-bridging at 8 feet on centers maximum for all joists and rafters more than 8 inches (4" at floor joists) depth. Use solid lumber blocking unless otherwise indicated.
11. Provide 1 inch by 6-inch let-in bracing (at approximately 45 degrees) every 25 feet in all stud walls not sheathed. Run continuous from top plate to sill plate. (Optional for alignment purposes only).
12. Provide all isolated posts with connections at top and bottom; Simpson CC caps or CB base unless specifically detailed otherwise.
13. Double joist under parallel partitions with solid blocking between joists over all points of support.
14. Untreated wood posts shall not be in contact with concrete; provide base per note 12 unless specifically detailed otherwise.
15. Do not cut or notch wood members unless specifically detailed on drawings.
16. Retighten all bolts, lags, screws, etc., prior to closing-in.
17. Treat all notches and cuts in treated wood with approved wood preservatives prior to closing-in.

B. Fire Stops
1. Ensure that no fire stop is less than 2 inches thick and no less in width than enclosed space within partition.
2. Provide stud wall and partitions with continuous rows of bridging or fire stops which will form a complete and effective separation in entire width of partitions, placed in such a manner that there will be no concealed air spaces greater than 8 feet in vertical dimension. Intermediate stops may be in line with opening headers. Provide furred space between stud walls and partitions with continuous fire stops at same elevation as those in the enclosing walls which must be installed horizontally, thus forming a solid stop from outside to outside of studs. At all concealed draft passages or shafts including furring spaces, ensure that maximum dimension is no more than 8 feet. Fire stop all partitions at all suspended ceilings.

C. Draft Stops
1. Construction materials shall be of the following materials:
   a. Minimum 5/8" gypsum board.
   b. Minimum 15/32" plywood sheathing.
2. Installation shall be at locations indicated on the drawings and per the following requirements:
   a. At roof-ceiling assemblies so that the area of the concealed space does not exceed 1000 sq. ft. with a maximum horizontal dimension of 60 feet.
   b. At roof-ceiling assemblies, where automatic fire sprinklers are installed in the concealed space, so that the arm of the concealed space does not exceed 3,000 sq.ft. with a maximum horizontal dimension of 100 ft.
   c. In attics, mansards, overhangs, false fronts set out from walls and similar concealed spaces so that the area between draft stops does not exceed 3000 sq.ft. with a maximum horizontal dimension of 60 ft.

3. Where automatic fire sprinklers are installed in the aforementioned spaces, the maximum area between draft stops shall be 9,000 sq.ft. with a maximum horizontal dimension of 100 feet.
4. Draft stops shall form an effective barrier in concealed attic spaces, between ceilings and the underside of roof sheathing.

D. Bearing
1. Make bearings full unless shown otherwise.
2. Finish bearing surfaces on which structural members are to rest so as to give sure and even support. Where framing members slope, cut or notch ends as required to give uniform bearing surface.

E. Shimming
1. Do not shim any framing member except where specifically shown or required by drawings.

F. Blocking
1. Install blocking required to support all items of finish and to cut off all concealed draft openings, both vertical and horizontal, between ceiling and floor.
2. 2x full depth solid blocking, shall be placed between joist or rafters at all supports.

G. Alignment
1. On all framing members to receive a finished surface, align finish sub-surface to vary not more than 1/8 inch from plane of surface of adjacent framing and furring members.

H. Plywood Placement
1. Place all plywood with face grain perpendicular to supports and continuously over at least two supports, except where otherwise detailed.
2. Center joints accurately over support unless otherwise shown on drawings.
3. Protect plywood from moisture until succeeding component or materials are installed to cover plywood.

I. Fastening
1. Use nails standard lengths and gauges.
2. For conditions not covered on drawings, provide penetration into piece receiving point not less than 1/2 length of nail or spike, provided that 16d nails may be used to connect two pieces of two inch thickness.
3. For bolts, drill holes 1/32-inch larger in diameter than bolts being used. Drill straight and true from one side only.
4. Bolt threads shall not bear on wood. Use washers under head and nut where both bear on wood. Use washers under all nuts.
5. For lag screws, and wood screws, pre-bore holes same diameter as root of threads; enlarge holes for shank diameter for length of shank.
6. Screw, do not drive, all lag screws and wood screws.
7. Retighten bolts before closing.

3.08 REPAIR/RESTORATION
3.09 RE-INSTALLATION
3.10 FIELD QUALITY CONTROL
3.11 ADJUSTING

3.12 CLEANING
3.13 DEMONSTRATION
3.14 PROTECTION
3.15 SCHEDULES

END OF SECTION

SECTION 07 19 00
WATER REPELLENTS

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  - 1. Water repellent coating applied to exterior concrete masonry and cast-in-place concrete surfaces.
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
  - 1. 03 30 00 Cast-In-Place Concrete
  - 2. 04 22 00 Concrete Unit Masonry
  - 3. 09 91 13 Exterior Painting
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS
- A. Design Requirements, Performance Requirements
  - 1. Meets ASTM-C309, Type 1 Class A and B for curing compounds.

1.05 SUBMITTALS
- A. General
- B. Product Data
  - 1. Submit manufacturer's technical data sheet for products specified.
- C. Shop Drawings
- D. Samples
- E. Quality Assurance/Control Submittals
  - 1. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, Qualification Statements
    - a. Submit manufacturer's certification of conformance to specified surface preparation and application rates.
    - b. Submit test results of initial and final RILEM test and final spray test.
- F. Closeout Submittals

1.06 QUALITY ASSURANCE
- A. Qualifications
  - 1. Manufacturer: Company specializing in manufacturing Products specified with minimum 5 years documented experience.
  - 2. Applicator: Company specializing in performing the work of this Section with minimum 5 years documented experience.
- B. Regulatory Requirements

1. Comply with applicable rules and regulations of Pollution-Control Regulatory Agency having jurisdiction regarding volatile organic compounds (VOC) and use of hydrocarbon solvents.

C. Certifications

D. Field Samples
   1. Prior to water repellent application, apply water repellent coating to field mock-up sample.
   2. Apply water repellent at an initial rate of application as determined by the manufacturer as presumed necessary to pass the RILEM water tube uptake test results specified.
   3. Allow seven days for the sample to cure. Perform a RILEM water tube uptake test on the treated area conducted by or supervised by the manufacturer's representative. Place one tube on the block surface and one tube on a mortar joint.
   4. Results: Absorption shall be not less than 1.0 milliliter of water using a RILEM water uptake tube at 60 mph wind driven rain equivalent. Apply additional repellent when tests results indicate failing results and retest until passing tests are achieved.
   5. Coverage rate for entire project shall be that which is used to for the mock-up sample passing test.

E. Mock-ups

F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling, and Unloading

B. Acceptance at Site

C. Storage and Protection
   1. Protect coating liquid from freezing.

D. Waste Management and Disposal

1.08 PROJECT CONDITIONS

A. Project Environmental Requirements
   1. Do not apply Product during the following conditions:
      a. Both ambient and surface temperatures are below 40 degrees F.
      c. Substrate surfaces have cured less than 30 days.
      d. Rain or temperatures below 40 degrees F are predicted for a period of 24 hours.
      e. Surface moisture readings as measured by an electronic moisture meter exceed 20%.

B. Existing Conditions

1.09 SEQUENCING

1.10 SCHEDULING

1.11 WARRANTY

A. General contractor must provide a written manufacturer's warranty prior to project completion. Said warranty from manufacturer will include replacement of materials and labor to repair any deficiencies reported for a period of no less than ten (10) years. Said warranty must be in writing from the coatings manufacturer. Applicator must provide a one year performance and workmanship warranty for one year.

1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS
- A. Rainguard Pro International, 3334 East Coast Highway #134, Corona del Mar, CA 92625, or Equal.

2.02 EXISTING PRODUCTS
2.03 MATERIALS
- A. (Rainguard) Mirco-Seal with Graffiti Control Water Repellent/Anti-Graffiti

2.04 MANUFACTURED UNITS
2.05 EQUIPMENT
2.06 COMPONENTS
2.07 ACCESSORIES
2.08 MIXES
2.09 FABRICATION
2.10 FINISHES
2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.01 INSTALLERS
3.02 EXAMINATION
- A. Site Verification of Conditions
  1. Examine surfaces and adjacent areas where products will be applied and verify that surfaces conform to specifications and manufacturer's requirements for substrate conditions. Do not proceed until satisfactory conditions have been corrected.
  2. Verify joint sealants are installed and cured.
  3. Beginning of application indicates acceptance of substrate conditions.

3.03 PREPARATION
- A. Protection
- B. Surface Preparation
  1. Surface cracks, holes, or other imperfections that exceed 1/64 of an inch shall be filled with pointing mortar. Masonry joints found to be unsound, hollow, or otherwise defective shall be raked out to a depth of 1/2 inch and pointed with mortar.
  2. Remove loose particles and foreign matter. Remove oil or foreign substance with a cleaning agent which will not affect coating.
  3. Scrub and rinse surfaces with water, and let dry.
  4. Protect adjacent surfaces not scheduled to receive coating. If applied on unscheduled surfaces, remove immediately, by approved method.

5. Protect landscaping, property, and vehicles from over spray and drift.

3.04 ERECTION
3.05 INSTALLATION
3.06 APPLICATION
A. Do not apply until masonry mortar is cured for seven days.
B. Apply coating in accordance with manufacturer's published instructions, using appropriate method and coverage rate.
C. A minimum of (2) two coats are required. Each coat shall be have a coverage rate of minimum of 50 SF per gallon.

3.07 CONSTRUCTION
3.08 REPAIR/RESTORATION
3.09 RE-INSTALLATION
3.10 FIELD QUALITY CONTROL
A. Site Tests, Inspection
B. Manufacturers' Field Services
1. Provide services of a manufacturer-authorized technical service representative to inspect and approve the substrate before application, to instruct the applicator on the product and application method to be used, and to field test the in-place surfaces after application.
2. Spray Test: After water repellent has dried, spray coated surfaces with water. After surfaces have adequately dried, recoat surfaces that show water absorption.
3. Water Uptake Test: Perform a RILEM Water Uptake test on a minimum of 10 locations on the completed project to confirm conformance to minimum results stated in Part 1 hereinbefore. Conduct test on upper and lower portions of the masonry surfaces and on an equal number of joints and block surfaces. Tests shall be conducted by the manufacturer's representative.
4. Furnish written certification that surface preparation and rate of application is completed in accordance with specification requirements and the manufacturer's recommendations. Furnish results of in-place RILEM and spray test.

3.11 ADJUSTING
3.12 CLEANING
A. Immediately clean water repellent from adjoining surfaces soiled or damaged by water repellent application as work progresses.
B. Repair damage caused by water repellent application.
C. Comply with manufacturer's published instructions for cleaning.

3.13 DEMONSTRATION
3.14 PROTECTION
3.15 SCHEDULES

END OF SECTION

SECTION 07 92 00
JOINT SEALANTS

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  1. Joint sealants
  2. Preparation for application of sealants
  3. Back-up material
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
  1. Field-Molded Concrete Paving Joint Sealant; See 32 13 13 Concrete Paving
  2. Filed-Molded Concrete Unit Masonry Joint Sealant; See 04 22 00 Concrete Unit Masonry
- D. Related Sections
  1. 04 22 00 Concrete Unit Masonry
  2. 32 13 13 Concrete Paving

1.02 REFERENCES
- A. SCAQMD Rule 1168 VOC Limits
- B. C.C.R., Title 24, Part 11, Table 5.504.4.1- Adhesive VOC Limit and Table 5.504.4.2 – Sealant VOC Limit

1.03 DEFINITIONS
- A. SCAQMD: South Coast Air Quality Management District
- B. VOC: Volatile Organic Compound

1.04 SYSTEM DESCRIPTIONS

1.05 SUBMITTALS
- A. Product Data
  1. Submit manufacturer's literature for each sealant material.
- B. Shop Drawings
  1. Submit Shop Drawings indicating sealant joint locations, with full-size sealant joint details.
- C. Samples
  1. Submit Samples indicating color range available for each sealant material intended for installation in exposed locations.
- D. Quality Assurance/Control Submittals
  1. Submit manufacturer’s certification materials comply with requirements specified.
  2. Submit manufacturer's adhesion compatibility test reports according to ASTM C794 for each substrate.
- E. Closeout Submittals

1.06 QUALITY ASSURANCE
- A. Qualifications
  1. The Work of this section shall be installed by a firm which has been in the business of installing similar materials for at least five

consecutive years; and can show evidence of satisfactory completion of five projects of similar size and scope.

2. Installer shall have applicators trained and approved by manufacturer for performing this Work.

B. Regulatory Requirements

1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers, and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits, as shown in C.C.R., Title 24, Part 11, Tables 5.504.4.1 and 5.504.4.2. Such products also shall comply with Rule 1168 prohibition on the use of certain toxic compounds (Chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene), except for aerosol products as specified in Subsection 2, below.

2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of California Code of Regulations, Title 17, commencing with Section 94507.

C. Certifications

D. Field Samples

1. At locations required, provide a Sample of sealant for each typical installation, approximately 24 inches long, including joint preparation, backing, sealant and tooling. Allow backing to extend 6 inches beyond end of sealant for inspection of substrate.

E. Mock-ups

F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling, and Unloading

B. Storage and Protection

1. Sealants shall be stored and installed at temperatures as recommended by manufacturer.

1.08 PROJECT CONDITIONS

1.09 SEQUENCING

1.10 SCHEDULING

1.11 WARRANTY

1. Five (5) year material warranty, two-year installation/application warranty.

1.12 SYSTEM STARTUP

1.13 OWNER'S INSTRUCTIONS

1.14 COMMISSIONING

1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Tremco Commercial Sealants & Waterproofing, 3735 Green Rd., Beachwood, OH, 44122, or equal.
B. Pecora Corporation, 165 Wambold Road, Harleysville, PA 19438
C. Dowsil, P.O. Box 994, Midland, MI 48686

2.02 EXISTING PRODUCTS

2.03 MATERIALS

A. Sealants

Sealants shall have normal curing schedules, shall be non-staining, color fast and shall resist deterioration due to ultraviolet radiation.

1. Sealant 1: Acrylic Latex, Non-Sag, Single-Component
   a. (Tremco) Tremflex 834
   b. (Pecora) AC-20+Silicone
2. Sealant 2:Not Used
3. Sealant 3: Fast Curing STPE Hybrid Sealant
   a. (Dowsil) DOWSIL Contractors Paintable Sealant
4. Sealant 4: Silicone, Non-Sag, Single-Component
   a. (Dowsil) 758 Silicone Weather Barrier Sealant
5. Sealant 5: Silicone, Non-Sag, Single Component, Mildew-Resistant
   b. (Dowsil) 786, Color selected by architect
6. Sealant 6: Polyurethane, Non-Sag, Single Component
   a. (Tremco) Dymonic 100
   b. (Pecora) DynaTrol I-XL
7. Sealant 7: Polyurethane, Non-Sag, Multi-Component
   a. (Tremco) Dymeric 240FC
   b. (Pecora) DynaTrol II
8. Sealant 8: Silicone, Non-Sag, Single-Component
   a. (Dowsil) 795 Silicone Building Sealant

B. Fire Rated Sealants
   1. See Section 07 84 43 Joint Firestopping

C. Joint Backing
   1. Cylindrical Sealant Backing: ASTM C 1330, Type B non-absorbent, bi-cellular material with surface skin, or Type O open-cell polyurethane, as recommended by sealant manufacturer for application.

D. Primer:
   1. Provide primer as required. Non-staining Type.
   2. Primer shall be a product of manufacturer of installed sealant.
   3. Primer shall be compatible with not only sealant, but substrate and finish on which to be applied.
   4. Primer must have been tested for durability on the surfaces to be sealed and specifically recommended for this installation by the manufacturer.

E. Bond Breaker:
   1. Polymer tape compatible with joint sealant materials and recommended by sealant manufacturer.

2.04 MANUFACTURED UNITS

2.05 EQUIPMENT

2.06 COMPONENTS

2.07 ACCESSORIES

2.08 MIXES
2.09 FABRICATION
2.10 FINISHES
2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.01 INSTALLERS
A. Sealants shall be installed by experienced mechanics using specified materials and proper tools.

3.02 EXAMINATION
A. Site Verification of Conditions
1. Examine joint profiles and surfaces to determine if work is ready to receive joint sealants. Verify joint dimensions are adequate for development of sealant movement capability. Proceed with joint sealant work once conditions meet sealant manufacturer's recommendations.

3.03 PREPARATION
A. Protection
B. Surface Preparation
1. Joint Surface Cleaning:
a. Clean joints prior to installing joint sealants using materials and methods recommended by sealant manufacturer.
b. Remove laitance, form-release agents, dust, and other contaminants. Clean nonporous and porous surfaces utilizing chemical cleaners acceptable to sealant manufacturer.
2. If recommended by the Manufacturer, remove paint and other protective coatings from surfaces to be sealed before priming and installation of sealants.
3. Preparation of surfaces to receive sealant shall conform to the sealant manufacturer's specifications. Provide air pressure or other methods to achieve required results. Provide masking tape to keep sealants off surfaces that will be exposed in finished Work.
4. Etch concrete or masonry surfaces to remove excess alkalinity, unless sealant manufacturer's printed instructions indicate that alkalinity does not interfere with sealant bond and performance. Etch with 5 percent solution of muriatic acid; neutralize with dilute ammonia solution, rinse thoroughly with water and allow to dry before sealant installation.
5. Perform preparation in accordance with ASTM C804 for solvent release sealants, and ASTM C962 for elastomeric sealants.
6. Concrete, masonry, and other porous surfaces, and any other surfaces if recommended by manufacturer, shall be primed before installing sealants. Primer shall be installed with a brush that will reach all parts of joints to be filled with sealant.

3.04 ERECTION

3.05 INSTALLATION

3.06 APPLICATION

A. General

1. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
2. Masking: Mask adjacent surfaces to prevent staining or damage by contact with sealant or primer.
3. Joint Priming: Prime joint substrates when recommended by sealant manufacturer or when indicated by preconstruction testing or experience. Apply recommended primer using sealant manufacturer's recommended application techniques.
4. Joint Backing: Select joint backing materials recommended by sealant manufacturer to be compatible with sealant material. Install backing material at depth required to produce profile of joint sealant allowing optimal sealant movement.
    a. Install bond breaker tape over substrates when sealant backings are not used.
5. Liquid Sealant Application: Install sealants using methods recommended by sealant manufacturer, in depths recommended for application. Apply in continuous operation from bottom to top of joint vertically and horizontally in a single direction. Apply using adequate pressure to fill and seal joint width.
    a. Tool sealants immediately with appropriately shaped tool to force sealants against joint backing and joint substrates, eliminating voids and ensuring full contact.
    b. Using tooling agents approved by sealant manufacturer for application.
6. Cleaning: Remove excess sealant using materials and methods approved by sealant manufacturer that will not damage joint substrate materials.
    a. Remove masking tape immediately after tooling joint without disturbing seal.
    b. Remove excess sealant from surfaces while still uncured.

B. Preformed Joint Sealant Application

1. Preparation: Prepare surfaces in accordance with sealant manufacturer's written instructions. Perform field adhesion testing to determine need for application of primer. Clean surfaces to dust free, and perform solvent wipe where recommended. Mask edges of surface to be treated.
2. Application: Apply bead of recommended liquid joint sealant to each side of joint in bead size recommended by manufacturer. Press extrusion into sealant using roller to ensure uniform and complete

contact. Lap vertical and horizontal joints as indicated in manufacturer's instructions. Trim preformed joint sealant. Remove masking tape and excess sealant.

C. Water-Resistive Barrier Transition Application

1. Preparation: Prepare field of weather barrier surface and surface of adjacent substrate in accordance with sealant manufacturer's written instructions. Perform field adhesion testing to determine need for application of primer. Clean surfaces to dust free, and perform solvent wipe where recommended.
2. Application: Apply bead of recommended liquid joint sealant to each side of joint in bead size recommended by manufacturer. Press transition extrusion into sealant using roller to ensure uniform and complete contact. Lap vertical and horizontal joints as indicated in manufacturer's instructions. Trim transition material. Remove excess sealant.

3.07 CONSTRUCTION

3.08 REPAIR/RESTORATION

3.09 RE-INSTALLATION

3.10 FIELD QUALITY CONTROL

A. Site Test, Inspection

1. Field-Adhesion Testing: Perform adhesion tests in accordance with manufacturer’s instructions and with ASTM C 1193, Method A.
   a. Perform 5 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate, and one test for each 1000 feet of joint length thereafter or 1 test per each floor per building elevation, minimum.
   b. For sealant applied between dissimilar materials, test both sides of joint.
2. Remove sealants failing adhesion test, clean substrates, reapply sealants, and re-test. Test adjacent sealants to failed sealants.
3. Submit report of field adhesion testing to Architect indicating tests, locations, dates, results, and remedial actions taken.

3.11 ADJUSTING

3.12 CLEANING

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.13 DEMONSTRATION

3.14 PROTECTION

A. Protect the Work of this section until Substantial Completion.

3.15 SCHEDULES

A. Application

Location	Type
Joint Sealants:	
at gypsum board, all joints/transitions/terminations/around penetrations	Sealant 1
at aluminum thresholds	Sealant 4
at interior door and window frames.	Sealant 3
at exterior door and window frames.	Sealant 8
at window wall, curtain wall, storefront systems	Sealant 8
at skylight framing systems	Sealant 8
at glass and glazing stops	Sealant 8
at ceramic tile and at plumbing fixtures	Sealant 5
at metal and concrete, masonry or mortar	Sealant 6
at exterior and interior vertical surfaces of concrete and masonry metal flashing	Sealant 6
Joint Sealants at interior horizontal surfaces of concrete	Sealant 7
at water-resistive barriers	Sealant 4
at Fiber Cement (When Painted) **at Fiber Cement (When Not Painted)**	Sealant 3 Sealant 8 w/ MFR's Primer

END OF SECTION

SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Hollow metal doors
   2. Hollow metal frames

B. Products Supplied But Not Installed Under This Section

C. Products Installed But Not Supplied Under This Section

D. Related Sections
   1. 07 62 00 Sheet Metal Flashing and Trim
   2. 07 92 00 Joint Sealants
   3. 08 71 00 Door Hardware
   4. 09 91 13 Exterior Painting

E. Allowances

F. Unit Prices

G. Measurement Procedures

H. Payment Procedures

I. Alternates

1.02 REFERENCES

A. ASTM A568 - Standard Specification for Steel Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.

B. ASTM A591 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hop-Dip Process

C. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

D. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

E. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

F. ASTM A1011 - Standard Specification for Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

G. ANSI/SDI A250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames.

H. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors and Hardware Reinforcing.

I. ANSI/SDI A250.6 Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.

J. ANSI/SDI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 1998.

K. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

L. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames (Formerly SDI-105).
M. DHI A115.1G - Installation Guide for Doors and Hardware.
N. SDI 111 - Recommended Standard Details for Steel Doors & Frames.
O. ANSI/NFPA 252 - Fire Tests of Door Assemblies.
P. ANSI/UL 10B - Fire Tests of Door Assemblies.
Q. ANSI/UL 10C - Positive Pressure Fire Tests of Door Assemblies.
R. ANSI/UL 1784 - Air Leakage Tests of Door Assemblies
S. UL - Building Materials Directory; Underwriters Laboratories Inc.
T. WH - Certification Listings; Warnock Hersey International Inc.
U. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.

1.03 DEFINITIONS
A. MSG: Manufacturers Standard Gage
B. SDI: Steel Door Institute
C. HMMA: Hollow Metal Manufacturers' Association
D. DHI: The Door and Hardware Institute

1.04 SYSTEM DESCRIPTIONS

1.05 SUBMITTALS
A. Product Data
1. Submit manufacturer's data sheets on each product to be used, including:
a. Preparation instructions and recommendations
b. Storage and handling requirements and recommendations
c. Installation methods
d. Manufacturers' technical data manual
e. Submit ANSI/SDI A250.8 – Current Edition
B. Shop Drawings
1. Show all openings in the door schedule and/or the Drawings.
2. Provide details of door design, door construction details and methods of assembling sections, hardware locations, anchorage and fastening locations and methods, door frame types and details including throat dimensions by analyzing all wall sections, wall assemblies, materials, structural drawings, anchor types and spacing, and finish requirements.
3. Provide door, frame, and hardware schedule in accordance with SDI 111.
C. Samples
D. Quality Assurance/Control Submittals
1. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, Qualification Statements
a. Provide manufacturer's certification that products comply with referenced standards as applicable.
b. Provide evidence of manufacturer's membership in the Steel Door Institute.
E. Closeout Submittals

1.06 QUALITY ASSURANCE

A. Qualifications

1. Provide all products from a single manufacturer who is a member of the Steel Door Institute.
2. Doors and frames shall conform to the requirements of ANSI A250.8-(R2008) (SDI-100) and other specifications herein named.
3. Fire-Ratings as indicated on the opening Schedule, when tested in accordance with NFPA 252 or UL 10C.
    a. Labeled by UL, WH, or other agency acceptable to the authority having jurisdiction.

B. Regulatory Requirements

1. Automatic and power-assisted doors and gates shall comply with **CBC Section 11B-404.3**.
2. Doors and doorways that are part of an accessible route shall comply with **CBC Section 11B-404**.
3. The clear opening width for a door shall be 32 inches minimum. For a swinging door it shall be measured between the face of the door and the stop, with the door open 90 degrees. The shall be no projections into the opening below 34 inches and 4 inches maximum projections into the opening between 34 inches and 80 inches above the finish floor or ground. Door closers and stops shall be permitted to be 78 inches minimum above the finish floor or ground. **CBC Section 11B-404.2.3**.
4. Handles, pulls, latches, locks, and other operable parts on accessible doors shall comply with **CBC Section 11B-309.4** and be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. Operable parts of such hardware shall be 34 inches minimum and 44 inches maximum above the finish floor or ground. Where sliding doors are in the fully open position, operating hardware shall be exposed and usable from both sides. **CBC Section 11B-404.2.7**.
5. The force for pushing or pulling open a door shall be as follows: **CBC Section 11B-404.2.9**.
    a. Interior hinged doors, sliding or folding doors, and exterior hinged doors: 5 lbs. (22.2N) maximum.
    b. Required fire doors: the minimum opening force allowable by the DSA Authority, not to exceed 15 lbs. (67N) maximum.
    c. The force required to activate any operable parts, such as retracting latch bolts or disengaging other devices shall be 5 lbs. (22.2N) maximum to comply with **CBC Section 11B-309.4.**
6. Door closing speeds shall be as follows: **CBC Section 11B-404.2.8**.
    a. Closer shall be adjusted so that the required time to move a door from an open position of 90 degrees to a position of 12 degrees from the latch is 5 seconds minimum.
    b. Spring hinges shall be adjusted so that the required time to move a door from an open position of 70 degrees to the closed position is 1.5 seconds minimum.
7. Thresholds shall comply with **CBC Section 11B-404.2.5**.
8. Floor stops shall not be located in the path of travel and 4 inches maximum from walls, per **DSA Policy 99-08**.

9. Hardware (including exit devices) shall not be provided with "Night Latch" (NL) function for any accessible doors or gates unless the following conditions are met per **DSA Interpretation 10-08 DSA / AC (External) revised 4/28/09**. Such conditions must be clearly demonstrated and indicated in the specifications:
    a. Such hardware has a 'dogging' feature.
    b. It is dogged during the time the facility is open.
    c. Such 'dogging' operation is performed only by employees as their job function (non-public use).
10. Pair of doors: Limit swing of one leaf to 90 degrees so that a clear floor space is provided beyond the arc of the swing for the wall-mounted tactile sign. **CBC Section 11B-703.4.2.1**.
11. Exit device touchpad shall be compliant with **State Fire Marshall Standard 12-10-3, Section 12-10-302**.
12. Comply with **CBC Chapter 10.**

C. Certifications
D. Field Samples
E. Mock-ups
F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING
A. Packing, Shipping, Handling, and Unloading
B. Acceptance at Site
1. Products shall be marked with Architect's opening number on all doors, frames, misc. parts and cartons.
2. Upon delivery, inspect all materials for damage; notify shipper and supplier if damage is found.
C. Storage and Protection
1. Protect products from moisture, construction traffic, and damage.
2. Store vertically under cover.
3. Place units on 4 inch high wood sills or in a manner that will prevent rust or damage.
4. Do not use non-vented plastic or canvas shelters that can create a humidity chamber.
5. Should wrappers become wet, remove immediately.
6. Provide ¼-inch space between doors to promote air circulation.
7. If the wrapper on the door becomes wet, it must be removed immediately.
D. Waste Management and Disposal

1.08 PROJECT CONDITIONS
1.09 SEQUENCING
A. Coordinate with door opening construction and door frame and door hardware installation.

1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE
A. Extra Materials

B. Maintenance Service
1. It is the responsibility of the installer to properly maintain doors and frames in accordance with SDI-124, Maintenance of Standard Steel Doors and Frames until date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Door Components Inc., 7980 Redwood Ave, Fontana, CA 92336, or Equal.
B. Curries/ASSA ABLOY, 5678 Concours Street, Ontario, CA 91764
C. Steelcraft/Allegion, 1520 Bridgegate Drive, Suite 100, Diamond Bar, CA 91765
D. Republic, 155 Republic Drive, McKenzie, TN 38201
E. Security Metal Products/ASSA ABLOY, 5700 Hannum Ave. #250, Culver City, CA 90230

2.02 EXISTING PRODUCTS

2.03 MATERIALS
A. Doors, frames, frame anchors, and hardware reinforcing for each of the levels and models specified shall be provided to meet the requirements of the performance levels specified. The material used in manufacturing these products and components shall comply with ANSI/SDI A250.8.
B. Hardware reinforcing on doors and frames shall comply with ANSI/SDI A250.6.
C. The physical performance levels shall be in accordance with ANSI/SDI A250.4.
D. All steels used to manufacture doors, frames, anchors, and accessories shall meet at least one or more of the following requirements:
1. Cold rolled steel shall conform to ASTM A1008 and A568.
2. Hot rolled, pickled and oiled steel shall comply with ASTM A1011 and A568.
3. Hot dipped zinc coated steel shall be of the alloyed type and comply with ASTM A924 and A653.
4. Steel Sheet, Electrolytic Zinc-Coated shall conform to ASTM A591.
E. Frames
1. Provide Levels and Models in accordance with ANSI/SDI A250.8 and in the configuration and sizes as indicated:
a. Interior frames: Frame configuration and depth as indicated on the drawings. Minimum thickness as follows:
1. Level 3 Extra heavy-duty: For use with:
Door Model 2 (seamless design): 0.053 inch (MSG. No. 16) minimum steel frame thickness with continuously welded seam dressed smooth.
b. Exterior frames: Provide in accordance with ANSI/SDI A250.8 in the frame configuration and depth as indicated on the drawings. Minimum thickness as follows:
1. Level 3 Extra heavy-duty: For use with:
Door Model 2 (seamless design): 0.053 inch (MSG. No. 16) minimum steel frame thickness with continuously welded seam dressed smooth.
2. Provide units of galvanized steel in the following locations:
a. All locations

3. Provide full profile welded (Continuously welded) type frames unless noted otherwise.
4. Provide frames with welded to frame anchors as detailed on drawings. Slip-in or twist-in anchors shall not be permitted.
5. Prepare all frames for all mortise template hardware. Frames shall be reinforced, drilled and tapped to receive mortised hinges, locks, latches, and flush bolts as required. Preparation shall be in accordance with ANSI/BHMA A156.115 American National Standard for Hardware Preparations in Steel Doors and Steel Frames and ANSI/SDI A250.6, Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
6. Frames shall be reinforced for surface applied hardware.
7. Minimum hardware reinforcing gages shall comply with Table 4 of ANSI/SDI A250.8.
8. Provide screw applied design glazing stops and beads where glazed lights are indicated.

F. Doors
1. Provide Levels and Models in accordance with ANSI/SDI A250.8 and in the configuration and sizes as indicated:
   a. Interior doors: Provide interior doors in accordance with ANSI/SDI A250.8 and in the configuration and sizes as indicated:
      1. Level 3 - Extra heavy-duty 1-3/4 inches:
         Model 2 - Seamless
   b. Exterior doors: Provide exterior doors in accordance with ANSI/SDI A250.8 and in the configuration and size as indicated on the opening schedule:
      1. Level 3 - Extra heavy-duty 1-3/4 inches:
         Model 2 - Seamless
2. Face steel sheet shall meet at least one or more of the following requirements:
   a. Level 3
      Model 2 - 0.053 inch (MSG No. 16) minimum thickness
3. End closure: The top and bottom of the doors shall be closed with flush closures channels. The flush closures channels shall have a minimum material thickness of 0.042 inch (MSG No. 18).
   a. Flush closure channels: Set back face of channel web flush with door top/bottom.
4. Core: Provide in accordance with ANSI/SDI A250.8.
   a. Non-Fire-Rated Doors: Mineral Board
   b. Fire-Rated Doors: Mineral Board
5. Door edge design: Provide in accordance with ANSI/SDI A250.8.
   a. Beveled edge
6. Prepare all doors for all mortise template hardware. Frames shall be reinforced, drilled and tapped to receive mortised hinges, locks, latches, and flush bolts as required. Preparation shall be in accordance with ANSI/BHMA A156.115 American National Standard for Hardware Preparations in Steel Doors and Steel Frames and ANSI/SDI A250.6, Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
7. Doors shall be reinforced for surface applied hardware.

8. Minimum hardware reinforcing gages shall comply with Table 4 of ANSI/SDI A250.8.
9. Provide screw applied design glazing stops and beads where glazed lights are indicated.
10. Provide louvers and vision lites where indicated on the Drawings in accordance with ANSI/SDI A250.8.
11. Provide steel astragals where indicated on the Drawings or where required by the manufacturer's listing.

2.04 MANUFACTURED UNITS
2.05 EQUIPMENT
2.06 COMPONENTS
2.07 ACCESSORIES
2.08 MIXES
2.09 FABRICATION
A. Shop Assembly
1. Fabricate doors and frames in accordance with ANSI/SDI A250.8.
2. Design clearances
a. Fabricate doors and frames to maintain the following clearances:
1. The clearance between the door and frame shall be 1/8 inch in the case of both single swing and pairs of doors.
2. The clearance between the meeting edges of pairs of doors shall be 3/16 inch plus or minus 1/16 inch. For fire rated applications, the clearances between the meeting edges of pairs of doors shall be 1/8 inch plus or minus 1/16 inch.
3. Interior doors: The clearance measured from the bottom of the door to the bottom of the frame (undercut) shall be a maximum of 3/4 inch unless otherwise specified. Fire door undercuts shall comply with ANSI/NFPA 80, "Fire Doors and Fire Windows."
4. Exterior Doors: The clearance measured from the bottom of the door to the bottom of the frame (undercut) shall be 5/8 inch unless otherwise specified.
5. The clearance between the face of the door and the stop shall be 1/16 inch to 3/32 inch.
6. All clearances shall be, unless otherwise specified in this document, subject to a tolerance of plus or minus 1/32 inch.

2.10 FINISHES
A. Shop Priming, Shop Finishing
1. Prime finish
a. Doors and frames shall be thoroughly cleaned, and chemically treated to ensure maximum paint adhesion.
b. All surfaces of the door and frame shall receive a factory applied coat of rust inhibiting primer, either air-dried or baked-on. The finish shall meet the requirements for

acceptance stated in ANSI/SDI A250.10 "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames."

2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.01 INSTALLERS

3.02 EXAMINATION

A. Site Verification of Conditions

1. Verify that project conditions are suitable before beginning installation of frames. Do not begin installation until conditions have been properly prepared.
2. Verify that completed concrete or masonry openings to receive butt type frames are of correct size.
3. Verify that gypsum board construction walls are the correct thickness.

3.03 PREPARATION

A. If opening preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.04 ERECTION

3.05 INSTALLATION

A. Install frames plumb, level, rigid, and in true alignment in accordance with ANSI/SDI A250.11 and Drawings.
B. Inspect and install fire rated doors and frames in accordance with NFPA 80 and their listing.
C. All frames shall be fastened to the adjacent structure so as to retain their position and stability.
D. Doors shall be installed and fastened to maintain alignment with frames to achieve maximum operational effectiveness and appearance. Doors shall be adjusted to maintain perimeter clearances specified. Shimming shall be performed by the installer as needed to assure the proper clearances are achieved.
E. Install hardware items in accordance with section 08 71 00 Door Hardware, the hardware manufacturer’s recommendations and templates, and ANSI/SDI A250.6, Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.

3.06 APPLICATION

3.07 CONSTRUCTION

3.08 REPAIR/RESTORATION

A. Any repair required to either the door or frame in a fire rated opening shall be conducted in accordance with NFPA 80.

3.09 RE-INSTALLATION

3.10 FIELD QUALITY CONTROL

3.11 ADJUSTING

A. Adjust doors for proper operation, free from binding or other defects.

3.12 CLEANING

A. Clean and restore soiled surfaces. Remove scraps and debris and leave site in a clean condition.

3.13 DEMONSTRATION

3.14 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.15 SCHEDULES

A. Refer to Opening Schedule on Drawings.

END OF SECTION

Section 08 71 00
Door Hardware

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.2 SUMMARY

A. Section Includes: Finish hardware except as otherwise specified or specifically omitted herein.

B. Related Sections:

1. Section 08 11 13 - Hollow Metal Doors and Frames.
2. Section 32 31 13 - Chain Link Fences and Gates.
3. Section 32 31 19 - Decorative Metal Fences and Gates.

C. Specific Omissions: Hardware for the following is specified or indicated elsewhere.

1. Windows.
2. Cabinets and locks.
3. Signs.
4. Toilet accessories.
5. Installation.
6. Rough hardware.

1.3 REFERENCES

A. Published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to Work of this Section where cited by abbreviations noted below (latest editions apply unless noted otherwise).

B. ADA - Americans with Disabilities Act Standards for Accessible Design.

C. ANSI - American National Standards Institute.

D. BHMA - Builders Hardware Manufacturers Association.

E. CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.

F. DSA - Division of the State Architect.

G. NFPA 80 - Fire Doors and Windows.

H. UL - Underwriters Laboratories.

1.4 SUBSTITUTIONS & SUBMITTALS

A. Requests for substitutions must be made in writing 10 days prior to bid date to allow architect to issue an addendum. If proposing a substitute, submit that product data attached to one showing specified item and indicate savings to be made. Provide sample if requested. No other substitutions will be allowed.

1. Items listed with no substitute manufacturers have been requested by the Owner to match existing.

B. SUBMITTALS: Submit six copies of schedule within 4 weeks after project has been awarded. Organize schedule into "Hardware Sets" with an index of doors and heading, indicating complete designations of every item required for each door or opening. Include the following information:

1. Type, style, function, size, quantity and finish of each hardware item. Use BHMA finish codes as per ANSI A156.18.
2. Name, part number and manufacturer of each item.
3. Fastenings and other pertinent information.
4. Location of hardware set cross referenced to indications on drawings both on floor plans and in door schedule.
5. Explanation of all abbreviations, symbols, and codes contained in schedule.
6. Mounting locations for hardware.
7. Door and frame sizes and materials.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Obtain each kind of hardware (latch and lock sets, exit devices, hinges, and closers) from only one manufacture, although several may be indicated as offering products complying with requirements.
2. Hardware supplier shall be a direct factory contract supplier who has in his employment a certified hardware consultant (AHC) who is available at all reasonable times during the course of the work for project hardware consultation to the Owner, Architect, and Contractor.

B. Schedule Designations: Except as otherwise indicated, the use of one manufacturer's numeric designation system in schedules does not imply that another manufacturer's products will not be acceptable, unless they are not equal in design, size, weight, finish, function, or other quality of significance. See 1.4.A for substitutions.

1.6 REGULATORY REQUIREMENTS

A. Conform to applicable requirements of the Americans with Disabilities Act Standards for Accessible Design regarding accessibility requirements for door and entrance hardware.

B. Doors and doorways that are part of an accessible route shall comply with CBC Section 11B-404.

C. The clear opening width for a door shall be 32 inches minimum. For a swinging door it shall be measured between the face of the door and the stop, with the door open 90 degrees. The shall be no projections into the opening below 34 inches and 4 inches maximum projections into the opening between 34 inches and 80 inches above the finish floor or ground. Door closers and stops shall be permitted to be 78 inches minimum above the finish floor or ground. CBC Section 11B-404.2.3.

D. Handles, pulls, latches, locks, and other operable parts on accessible doors shall comply with CBC Section 11B-309.4 and be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. Operable parts of such hardware shall be 34 inches minimum and 44 inches maximum above the finish floor or ground. Where sliding doors are in the fully open position, operating hardware shall be exposed and usable from both sides. CBC Section 11B-404.2.7.

E. The force for pushing or pulling open a door shall be as follows: CBC Section 11B-404.2.9.

1. Interior hinged doors, sliding or folding doors, and exterior hinged doors: 5 lbs. (22.2N) maximum.
2. Required fire doors: the minimum opening force allowable by the DSA Authority, not to exceed 15 lbs. (66.7N) maximum. These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position.
3. The force required for activating any operable parts, such as lever hardware, or disengaging other devices shall be 5 lbs. (22.2N) maximum to comply with CBC Section 11B-309.4.

F. Door closing speeds shall be as follows: CBC Section 11B-404.2.8.

1. Closer shall be adjusted so that the required time to move a door from an open position of 90 degrees to a position of 12 degrees from the latch is 5 seconds minimum.
2. Spring hinges shall be adjusted so that the required time to move a door from an open position of 70 degrees to the closed position is 1.5 seconds minimum.

G. Thresholds shall comply with CBC Section 11B-404.2.5.

H. Floor stops shall not be located in the path of travel and 4 inches maximum from walls.

I. Hardware (including exit devices) shall not be provided with “Night Latch” (NL) function for any accessible doors or gates unless the following conditions are met (such conditions must be clearly demonstrated and indicated in the specifications):

1. Such hardware has a ‘dogging’ feature.
2. It is dogged during the time the facility is open.
3. Such ‘dogging’ operation is performed only by employees as their job function (non-public use).

J. Pair of doors: Limit swing of one leaf to 90 degrees so that a clear floor space is provided beyond the arc of the swing for the wall-mounted tactile sign. CBC Section 11B-703.4.2.

K. Doors shall be capable of locking from the inside of the room when there are 5 or more occupants, as per DSA Bulletin 11-05.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site: Individually package each unit of finish hardware complete with proper fastening and appurtenances, clearly marked on the outside to indicate contents and specific locations in the Work.

B. Deliver packaged hardware items at the times and to the locations (shop or field) for installation, as directed by the Contractor.

1.8 PROJECT CONDITIONS

A. Coordination: Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.

B. Upon request, check the Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.9 WARRANTY

A. Provide guarantee from hardware supplier as follows:

1. Closers: Five years, except electronic closers, two years.
2. Exit Devices: Two years.
3. All other Hardware: Two years.

PART 2 - MATERIALS

2.1 MANUFACTURERS

A. Approval of manufacturers other than those listed below shall be in accordance with paragraph 1.4.A.

Item:	Manufacturer:	Acceptable Substitute:
Continuous Hinges	Pemko	Hager, Ives
Locksets	Schlage	Owners standard
Cylinders	Schlage	Owners standard
Exit Devices	Von Duprin	Owners standard
Surface Closers	LCN	Owners standard
Anti Vandal Pulls	Ives	Rockwood, Trimco
Kick Plates	Trimco	Rockwood, Ives
Key Vaults	Knox	As specified
Cylinder Guards	Keedex	Or equal
Gate Boxes	Keedex	Or equal
Gate Closers	Locinox	Or equal

Safety Cables	Locinox	Or equal
Gate Hinges	D&D Technologies	Or equal

B. Furnish items of hardware required to complete the work in accordance with these specifications and the manufacturers' instructions. Items of hardware not specified shall be provided even though inadvertently omitted from this specification. Items shall be of equal quality and type.

C. Where the exact types of hardware specified are not adaptable to the finished shape or size of the members requiring hardware, furnish suitable types having as nearly as practicable the same operation and quality as the type specified, subject to Architect's approval.

2.2 MATERIALS

A. Continuous Hinges: Hinge open widths shall be minimum, but of sufficient size to permit door to swing 180 degrees. Where necessary to maintain door clearance at jamb trim, frame conditions, door reveals and similar conditions, furnish wide throw hinges as approved by the Architect. Where door is indicated as having fire resistance rating, provide UL listed and labeled hardware.

B Exit Devices: Furnish devices with sex bolts unless otherwise specified. Lever handle trim shall match locksets.

1. Provide glass bead kits of proper thickness where the rail assembly of the exit device crosses a lite.

C. Surface Door Closers: Full rack and pinion type with removable non-ferrous case. Furnish closers with sex bolts unless otherwise specified. Place closers inside building, stairs, and rooms. Closers shall be non-handed, non-sized, and installed to permit door to swing 180 degrees.

1. Flush transom offset brackets shall be used where parallel arm closers are listed for doors with fixed panels over.
2. Provide drop brackets, shoe supports, and blade stop spacers as required at narrow top rails

D. Protection Plates: Provide kick, armor, or mop plates with four beveled edges, .050 inches minimum thickness, height called for in schedule by width less 2-inches. Furnish with machine or wood screws of bronze or stainless steel to match other hardware.

E. Screws: Exposed screws shall be Phillips head. Do not use self-drilling, self-tapping screws, unless furnished by hardware manufacturer for the specific condition or for mounting flat-goods such as push plates and kick plates.

2.3 FINISH

A. Generally to be BHMA 626 Satin Chromium.

1. Areas using BHMA 626 shall have push, pulls and kick plates of BHMA 630, Satin Stainless Steel, unless otherwise noted.

B. Factory paint door closers to match other hardware, unless otherwise noted.

C. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

2.4 KEYING REQUIREMENTS

A. Contact the District Locksmith with Romoland School District (951-926-8264) for keying requirements. Keying system shall be coordinated with the Owner and approved by Owner's representative in writing. Furnish construction key system in accordance with lock manufacturers' standard. Where interchangeable core systems are used, provide temporary cores for construction keying.

1. Key system shall be Schlage Everest 29T, FSIC cylinders.

B. Initiate and conduct meeting with the Owner to determine system keyway, keybow style, structure, and degree of geographic exclusivity. Furnish Owner's written approval of the system.

C. For protection of the Owner, cylinders shall be keyed at the factory of the cylinder manufacturer where permanent records are maintained. Permanently inscribe each key with number that identifies cylinder manufacturer key symbol, and notation "DO NOT DUPLICATE".

D. Deliver permanent keys and cylinder cores directly to Owner by registered security shipment direct from hardware manufacturer. Hardware supplier shall not cut keys.

E. Keying Schedule: Submit three copies of separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks have been fulfilled.

PART 3 - EXECUTION

3.1 HARDWARE LOCATIONS:

A. Exit Device: 36 to 44 inches above finished floor. Verify manufacturers' template with door design.

B. Conform to CCR, Title 24, Part 2, and ADA for positioning requirements for accessibility.

3.2 INSTALLATION

A. Pre-Installation Meetings: Initiate and conduct with supplier, installer, and related trades, coordinate materials and techniques, and sequence complex hardware items and systems installation. Include manufacturers' representatives of locks, panic hardware, and door closers in the meetings.

B. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment

substrate as necessary for proper installation and operation.

3.3 ADJUSTING

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly.

B. Inspection: Hardware supplier shall inspect hardware furnished within 10 days of contractors request and include with his guarantee a statement that this has been accomplished. Inspector or Contractor will sign off the hardware as being complete and correctly installed and adjusted. Further corrections of defective material shall be the responsibility of his representative.

3.4 SCHEDULE OF DOOR HARDWARE

A. Legend of listed manufacturers:

DDT	D&D Technologies
IVE	Ives
KEE	Keedex
KNX	Knox
LCN	LCN
LOX	Locinox
PEM	Pemko
SCH	Schlage
TRM	Trimco
VON	Von Duprin

B. The last column in the Hardware Schedule refers to the manufacturer listed above.

C. The Door Schedule on the Drawings indicates which Hardware Set is used with each door.

D. Schedule of Door Hardware:

HW-1
Each single door to have

1	CONTINUOUS HINGE	FM-HD1	628	PEM
1	EXIT DEVICE	AX-PA-LD-99NL-OP x 110NL x WH	626	VON
1	RIM CYLINDER	20-057-ICX	626	SCH
1	PERMANENT CORE	23-030	626	SCH
1	CYLINDER GUARD	K-24	626	KEE
1	ANTI VANDAL PULL	VR910NL	630	IVE
1	SURFACE CLOSER	4040XP-SHCUSH x SRI	689	LCN
1	KICK PLATE	K0050 - 10 x 2 LDW x B4E	630	TRM
3	SILENCER	1229A	GRY	TRM

HW-SG1
Each single gate to have

2	GATE HINGE	PER GATE DETAIL	---	---
1	GATE LATCH	PER GATE DETAIL	---	---
1	PADLOCK	KS43F3200	606	SCH
1	PERMANENT CORE	23-030	606	SCH

Note: Balance of material provided by Chain Link Gate Manufacturer

HW-SG2
Each pair gate to have

4	GATE HINGE	CI-3900	602	DDT
2	SAFETY CABLE	U-SAFE	---	LOX
2	PADLOCK	KS43F3200	606	SCH
2	PERMANENT CORE	23-030	606	SCH
2	DROP ROD	PER GATE DETAIL	---	---

Note: Balance of material provided by Steel Decking Gate Manufacturer

HW-SG3
Each pair gate to have

8	GATE HINGE	PER GATE DETAIL	---	---
1	GATE LATCH	PER GATE DETAIL	---	---
1	PADLOCK	KS43F3200	606	SCH
1	PERMANENT CORE	23-030	606	SCH
1	KEY VAULT	3263	ALU	KNX
2	DROP ROD	PER GATE DETAIL	---	---

Note: Balance of material provided by Chain Link Gate Manufacturer

HW-SG4
Each single gate to have

2	GATE HINGE	PER GATE DETAIL	---	---
1	GATE LATCH	PER GATE DETAIL	---	---
1	PADLOCK	KS43F3200	606	SCH
1	PERMANENT CORE	23-030	606	SCH
1	KICK PLATE	PER GATE DETAIL	---	---

Note: Balance of material provided by Chain Link Gate Manufacturer

HW-SG5
Each pair gate to have

4	GATE HINGE	PER GATE DETAIL	---	---
1	GATE LATCH	PER GATE DETAIL	---	---
1	PADLOCK	KS43F3200	606	SCH
1	PERMANENT CORE	23-030	606	SCH
2	DROP ROD	PER GATE DETAIL	---	---

Note: Balance of material provided by Chain Link Gate Manufacturer

HW-SG6
Each single gate to have

1 SET	GATE HINGE/CLOSER	MAMMOTH-HD x CLB-HD	ALU	LOX
1	EXIT DEVICE	AX-PA-LD-99NL-OP x 110NL x WH	626	VON
1	RIM CYLINDER	20-057-ICX	626	SCH
1	PERMANENT CORE	23-030	626	SCH
1	CYLINDER GUARD	K-24	626	KEE
1	GATE BOX	K-BX5152 (CUSTOM SIZE)	600	KEE

Note: Balance of material provided by Chain Link Gate Manufacturer

END OF SECTION

SECTION 09 91 13
EXTERIOR PAINTING

PART 1 - GENERAL

1.01 SUMMARY
- A. Section Includes
  1. Block Fillers
  2. Primers
  3. Exterior Paints
  4. Exterior High-Performance Paint
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
  1. 05 12 00 Structural Steel Framing
  2. 07 19 00 Water Repellents
  3. 09 91 23 Interior Painting
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES
- A. C.C.R., Title 24, Part 11, 5.504.4.3 Paints and Coatings

1.03 DEFINITIONS
- A. Blocking: Two painted surfaces sticking together such as a painted door sticking to a painted jamb.
- B. Bio-Pruf: Biostabilizing additive, to protect products from premature microbial degradation.
- C. EG: Ethylene Glycol. Ethylene glycol is listed as a hazardous air pollutant (HAP) by the U.S. EPA.
- D. EPR: Environmental Performance Rating. Master Painters Institute (MPI) formula that relates to VOC, Performance of Category, Gloss and Appropriate specified use. Higher values equate to greater eco-efficiency.
- E. MPI: Master Painters Institute. Organization that establishes architectural paint standards and quality assurance programs in North America. www.paintinfo.com.
- F. PDCA: Painting & Decorating Contractors of America. www.pdca.org.
- G. RAVOC: Reactivity adjusted VOC. "Reactivity" means the ability of a VOC to promote ozone formation
- H. SSPC: The Society for Protective Coatings publishes Scopes of SSPC Surface Preparation Standards and Specifications. www.sspc.org.

1.04 SYSTEM DESCRIPTIONS

1.05 SUBMITTALS
- A. Product Data
  1. Submit product data for each type of product. Include preparation requirements and application instructions.
- B. Shop Drawings
- C. Samples

1. Submit samples for initial selection
2. Submit samples for verification that in each color and gloss topcoat.
    a. Submit samples on rigid backing, no smaller than 7" x 10" or larger than 8.5" x 11"
    b. Label each sample for project, architect, contractor, paint color name and number, and paint brand

D. Quality Assurance/Control Submittals
1. Design data, Test Reports, Certificates, Manufactures' Instructions, Manufactures' Field Reports, Qualification Statements
    a. Printed statement of VOC Content
    b. Documentation indicating the paints and coatings meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. Closeout Submittals

1.06 QUALITY ASSURANCE

A. Qualifications

B. Regulatory Requirements
1. VOC Content: Products shall comply with VOC limits of SCAQMD and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24)].
    1. Flat Paints and Coatings: 50 g/L.
    2. Nonflat Paints and Coatings: 50 g/L.
    3. Primers, Sealers, and Undercoaters: 100 g/L.
    4. Rust Preventative Coatings: 100 g/L.
    5. Floor Coatings: 50 g/L.
    6. Shellacs, Clear: 730 g/L.
    7. Shellacs, Pigmented: 550 g/L.
2. Colorants: The use of colorants containing hazardous chemicals, such as ethylene glycol, is prohibited.

C. Certifications

D. Field Samples

E. Mock-ups
1. Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under verification sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
2. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
    a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
    b. Other Items: Architect will designate items or areas required.
    c. Final approval of color selections will be based on mockups.
        1. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling, and Unloading

B. Storage and Protection

1. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg. F or more than 120 deg. F.
2. Maintain containers in clean condition, free of foreign materials and residue.
3. Remove rags and waste from storage areas daily.

C. Waste Management and Disposal

1.08 PROJECT CONDITIONS

A. Project Environmental Requirements

1. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 105 deg F.
2. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
3. Painting contractor should follow proper painting practices and exercise judgment based on his or her experience and project specific conditions as to when to proceed.

1.09 SEQUENCING

1.10 SCHEDULING

1.11 WARRANTY

1.12 SYSTEM STARTUP

1.13 OWNER'S INSTRUCTIONS

1.14 COMMISSIONING

1.15 MAINTENANCE

A. Extra Materials

1. Furnish extra materials from the same product run that match products installed and that are packaged with protective covering for storage and identified with labels describing content.
   a. Paint 5% but not less than 5 gal of each material and color applied.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Exterior Paint and Primer

1. Dunn-Edwards Corp., 4885 E. 52nd Place, Los Angeles, CA 90058

B. Exterior Structural Steel & Metal Fabrications Primer and Paint

1. Tnemec, Inc., 123 West 23 Avenue North, Kansas City, MO 64116.

2.02 EXISTING PRODUCTS

2.03 MATERIALS

A. Colors/Sheens

1. As selected by Architect from Manufacturer's full range of colors and sheens as well as any custom color matching.
2. A finish and color schedule will be furnished after award of the Contract.
3. Exterior colors shall be based on a maximum of (3) three base colors and a maximum of (3) three accent colors with a maximum of (1) one deep or bright color.
4. Exterior sheens will be based on a maximum of (5) five sheens, including selections from: gloss, semi-gloss, velvet, low sheen, and flat.

B. Block Fillers

1. (Dunn-Edwards) SMOOTH BLOCFIL PREMIUM

C. Primers

1. (Dunn-Edwards) EFF-STOP
2. (Dunn-Edwards) ULTRA-GRIP Premium
3. (Dunn-Edwards) ENDURAPRIME

E. Exterior Paints

1. (Dunn-Edwards) SPARTASHIELD

F. Exterior Structural Steel & Metal Fabrications Primer and Paint

1. Primer: See Section 05 12 00 Structural Steel Framing
   See Section 05 50 00 Metal Fabrications
2. Intermediate and Top Coats (Tnemec) Series L69, Series 1095

2.04 MANUFACTURED UNITS

2.05 EQUIPMENT

2.06 COMPONENTS

2.07 ACCESSORIES

2.08 MIXES

2.09 FABRICATION

2.10 FINISHES

2.11 SOURCE QUALITY CONTROL

A. Tests, Inspection

1. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
   a. Owner may engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at project site. Samples will be identified, sealed, and certified by testing agency.
   b. Testing agency will perform tests for compliance with product requirements.
   c. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will comply with requirements to use

compatible products and systems as described in this specification. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

2.01 INSTALLERS

3.02 EXAMINATION

A. Site Verification of Conditions

1. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
2. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   a. Concrete: 12 percent.
   b. Masonry (Clay and CMU): 12 percent.
   c. Wood: 15 percent.
   d. Gypsum Board: 12 percent.
   e. Plaster: 12 percent.
3. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
4. Plaster Substrates: Verify that plaster is fully cured, including pH testing to determine that alkalinity is within limits established by the manufacturer.
5. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.
6. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
7. Proceed with coating application only after unsatisfactory conditions have been corrected.
   a. Application of coating indicates acceptance of surfaces and conditions.

3.03 PREPARATION

A. Protection

B. Surface Preparation

1. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
2. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
   a. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
3. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
   a. Remove incompatible primers and re-prime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

4. Concrete Substrates (Where specifically indicated on drawings)
    a. Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions, including pH testing to determine that alkalinity is within limits established by the manufacturer.
5. Masonry Substrates (Where specifically indicated on drawings)
    a. Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.
6. Steel Substrates:
    a. Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
        1. SSPC-SP 1, "Solvent Cleaning."
        2. SSPC-SP 2, "Hand Tool Cleaning."
        3. SSPC-SP 3, "Power Tool Cleaning."
        4. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
        5. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
7. Shop-Primed Steel Substrates:
    a. Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
8. Galvanized-Metal Substrates (Where specifically indicated on drawings)
    a. Remove grease and oil residue from galvanized sheet metal fabricated from coil stock to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
9. Aluminum Substrates (Where specifically indicated on drawings)
    a. Remove loose surface oxidation.
10. Wood Substrates:
    a. Scrape and clean knots, and apply coat of knot sealer before applying primer.
    b. Sand surfaces that will be exposed to view, and dust off.
    c. Prime edges, ends, faces, undersides, and backsides of wood.
    d. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.04 ERECTION

3.05 INSTALLATION

3.06 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
    1. Use applicators and techniques suited for paint and substrate indicated.

2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Block Fillers: Provide block fill as scheduled to conform to the following PDCA Standard P12-05:
1. Level 3 - Premium Fill: One or multiple coats of high performance block filler manufactured to be applied at a high dry film build. Block filler shall be back-rolled to eliminate voids and reduce the majority of the masonry profile depth.

F. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following work where exposed in equipment rooms:
   a. Equipment, including panelboards and switch gear.
   b. Uninsulated metal piping.
   c. Uninsulated plastic piping.
   d. Pipe hangers and supports.
   e. Metal conduit.
   f. Plastic conduit.
   g. Tanks that do not have factory-applied final finishes.
   h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
2. Paint the following work where exposed in occupied spaces:
   a. Equipment, including panelboards.
   b. Uninsulated metal piping.
   c. Uninsulated plastic piping.
   d. Pipe hangers and supports.
   e. Metal conduit.
   f. Plastic conduit.
   g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
   h. Other items as directed by Architect.

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.07 CONSTRUCTION

3.08 REPAIR/RESTORATION

A. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.09 RE-INSTALLATION

3.10 FIELD QUALITY CONTROL

3.11 ADJUSTING

3.12 CLEANING

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

3.13 DEMONSTRATION

3.14 PROTECTION

A. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave undamaged.

3.15 SCHEDULES

A. Steel (Structural Steel)

1. Primer Coat – Shop-Applied Structural Steel Primer
   See Section: 05 12 00 Structural Steel Framing
2. Intermediate Coat – (Tnemec) Series L69, Sheen: Satin
3. Top Coat – (Tnemec) Series 1095, Sheen: Semi-Gloss

Note! Min. Dri Film Thickness (DFT) per Intermediate Coat: 3.0 mils
Note! Min. Dri Film Thickness (DFT) per Top Coat: 3.0 mils

B. Steel (Miscellaneous Steel Fabrications)

1. Primer Coat – Shop-Applied Structural Steel Primer
   See Section: 05 50 00 Metal Fabrications
2. Intermediate Coat – (Tnemec) Series L69, Sheen: Satin
3. Top Coat – (Tnemec) Series 1095, Sheen: Semi-Gloss

Note! Min. Dri Film Thickness (DFT) per Intermediate Coat: 3.0 mils
Note! Min. Dri Film Thickness (DFT) per Top Coat: 3.0 mils

C. Steel (Hollow Metal Doors and Frames)

1. 1st Primer Coat – Factory Applied Shop Primer
2. 2nd Primer Coat – (Dunn Edwards) ENDURAPRIME
2. 1st Top Coat – (Dunn-Edwards) SPARTASHIELD, Sheen: Semi-Gloss
3. 2nd Top Coat - (Dunn-Edwards) SPARTASHIELD, Sheen: Semi-Gloss

Note! Min. Dri Film Thickness (DFT) per Primer Coat: 2.0 mils
Note! Min. Dri Film Thickness (DFT) per Top Coat: 1.5 mils

D. Concrete Unit Masonry
   1. 1st Coat – Water Repellent Coating
   2. 2nd Coat – Water Repellent Coating
      See Section 07 19 00 Water Repellents

END OF SECTION

SECTION 10 14 67
TACTILE SIGNAGE

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  - 1. Photopolymer Tactile Signage
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS
- A. Design Requirements, Performance Requirements
  - 1. Provide photopolymer signage that conforms to the requirements of 2025 C.C.R., Title 24, Part 2, Chapter 11B
  - 2. All signage shall be integral, monolithic, and one-piece. Adhered letters will not be accepted.

1.05 SUBMITTALS
- A. Product Data
  - 1. Submit Product Data for specified items.
- B. Shop Drawings
  - 1. Submit shop drawing and catalog cuts of items to be provided. Shop Drawings shall be prepared by Manufacturer.
  - 2. Shop Drawings shall show actual sizes, lettering, graphics, construction details of each type of sign and mounting details with appropriate fasteners for specific project substates.
  - 3. Shop Drawings shall a floor plan that identifies all sign occurrences.
- C. Samples
  - 1. Submit samples of all products and materials including color, finish, pattern or texture exist, including fasteners, and adhesive.
  - 2. Submit selection samples.
  - 3. Submit verification samples.
- D. Quality Assurance/Control Submittals
  - 1. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, Qualification Statements
- E. Closeout Submittals

1.06 QUALITY ASSURANCE
- A. Qualifications

1. Products and materials to be provided are to be from manufacturers and producers regularly engaged full-time in the manufacture or production of this and similar items, with a history of successful manufacture or production acceptable to the Owner.
2. In addition to complying with pertinent codes and regulations, comply with industry and trade standards normally associated with this product or material, except where specified product or material is superior in quality to industry and trade standards.

B. Regulatory Requirements
1. All signage shall comply with 2025 C.C.R., Title 24, Part 2, Chapter 11B
2. Raised characters shall comply with CBC Section 11B-703.2:
   a. Depth: It shall be 1/32 inch minimum above their background and shall be sans serif uppercase and be duplicated in Braille.
   b. Height: It shall be 5/8" inch minimum and 2" inches maximum based on the height of the uppercase letter I. CBC Section 11B-703.2.5
   c. Finish and Contrast: Characters and their background shall have a non-glare finish. Characters shall contrast with their background with either light characters on a dark background or dark characters on a light background. CBC Section 11B-703.5.1.
   d. Line Spacing between the baselines or separate lines of characters within a message shall be 135% min. and 170% max. of the character height per CBC Section 11B-703.2.8.
   e. Format: Text shall be in horizontal format. CBC Section 11B-703.2.9.
3. Raised Character Proportions: It shall be selected from fonts where the width of the uppercase letter 'O' is 60% minimum and 110% maximum of the height of the uppercase letter 'I'. Stroke thickness of the uppercase letter 'I' shall be 15% maximum of the height of the character. CBC Sections 11B-703.4 and 11B-703.6
4. Character Spacing: Spacing between individual tactile characters shall comply with CBC Section 11B-703.2.7 and 11B-703.2.8
5. Braille: It shall be contracted (Grade 2) and shall comply with CBC Sections 11B-703.3 and 11B-703.4. braille dots shall have a domed and rounded shape and shall comply with CBC Table and Figure 11B-703.3.1.
6. Mounting Height: A tactile sign shall be located 48" minimum to the baseline of the lowest Braille cells and 60" maximum to the baseline of the highest line of raised characters above the finish floor or ground surface.
7. Mounting location: A tactile sign shall be located on the approach side, as one enters or exits rooms or space, and tactile characters shall be centered within the required clear floor space per CBC Section and Figure 11B-703.4.2 as follows:
   a. A clear floor space of 18" x 18" minimum, centered on the tactile characters, shall be provided beyond the arc of any

door swings between the closed position and 45 degree open position.

b. On the wall at the latch side of a single door
c. On the inactive leaf of a double door with one active leaf.
d. On the wall at the right side of a double door with two active leafs.
e. On the nearest adjacent wall where there is no wall space at the latch side of a single door or no space at the right side of a double door with two active leafs.

8. Visual Characters shall comply with CBC Section 11B-703.5 and shall be 40" minimum above finish floor or ground. Visual character stroke thickness of the uppercase letter "I" shall be 10% minimum and 20% maximum of the height of the character. CBC Section 11B-703.5.7.
   a. Finish and Contrast: Characters and their background shall have a non-glare finish. Character shall contrast with their background with either light characters on a dark background or dark characters on a light background. CBC Section 11B-703.5.1.
   b. Line Spacing between the baselines of separate lines of characters within a message shall be 135% min. and 170% max. of the character height per CbC Section 11B-703.5.9.
   c. Character Spacing between individual adjacent characters shall be 10% min. and 53% max of character height per CBC Section 11B-703.5.8.
9. Pictograms shall comply with CBC Section 11B-703.6
10. Symbol of accessibility shall comply with CBC Section 11B-703.7
11. Variable message signs shall comply with CBC Section 11B-703.8.

C. Certifications
D. Field Samples
E. Mock-ups
F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling, and Unloading
B. Acceptance at Site
C. Storage and Protection
   1. Store in a safe, dry place with all shop-supplied protection and labeling intact and legible until set, applied or installed.
   2. Use all reasonable means necessary to protect products and materials before, during and after installation.

1.08 PROJECT CONDITIONS

1.09 SEQUENCING

1.10 SCHEDULING

1.11 WARRANTY

A. Provide Owner with a written warranty as a condition of work acceptance, signed by Contractor and installer (where applicable), agreeing to maintain, repair and/or replace products and materials for one year following acceptance, and without additional cost to Owner.

1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Identity Group, 1480 Gould Drive, Cookeville, TN 38506, or equal.

2.02 EXISTING PRODUCTS
2.03 MATERIALS
2.04 MANUFACTURED UNITS
A. Tactile Signage
1. Material: Photopolymer
2. Thickness:1/4-inch
3. Raised tactile lettering: Yes, 1/32-inch
4. Radiused Corners: Yes, 1/4-inch
5. Surface Painted,
a. Color: Custom color, as selected by architect
b. Sheen: as selected by Architect
c. Coating: Graffiti Proof

2.05 EQUIPMENT
2.06 COMPONENTS
2.07 ACCESSORIES
2.08 MIXES
2.09 FABRICATION
2.10 FINISHES
2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.01 INSTALLERS
3.02 EXAMINATION
3.03 PREPARATION
3.04 ERECTION
3.05 INSTALLATION
A. Install signs in strict accordance with manufacturer's recommendation and according to details of the drawings.

3.06 APPLICATION
3.07 CONSTRUCTION
3.08 REPAIR/RESTORATION
3.09 RE-INSTALLATION
3.10 FIELD QUALITY CONTROL
3.11 ADJUSTING
3.12 CLEANING
3.13 DEMONSTRATION
3.14 PROTECTION

3.15 SCHEDULES

END OF SECTION

SECTION 10 28 00
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  - 1. Washroom accessories as scheduled in this section and as indicated on the drawings, including but not limited to the following:
    - a. Wall Mounted Waste Receptacle
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS

1.05 SUBMITTALS
- A. General
- B. Product Data
  - 1. Submit manufacturer's data sheets for each product specified, including the following:
    - a. Installation instructions and recommendations.
    - b. Storage and handling requirements and recommendations.
    - c. Cleaning and maintenance instructions.
    - d. Replacement parts information.
- C. Shop Drawings
  - 1. Submit a toilet accessory schedule, indicating the type and quantity to be installed in each washroom. Use room numbers as indicated on the Drawings.
- D. Samples
- E. Quality Assurance/Control Submittals
  - 1. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, Qualification Statements
- F. Closeout Submittals

1.06 QUALITY ASSURANCE
- A. Qualifications
  - 1. Provide products manufactured by a company with a minimum of 10 years successful experience manufacturing similar products.
  - 2. To the greatest extent possible provide products from a single manufacturer.
- B. Regulatory Requirements

1. Elements of Sanitary facilities shall be mounted at locations in compliance with **CBC Sections 11B-602 through 11B-612.**
2. Grab bars in toilet facilities and bathing facilities shall comply with **CBC Section 11B-609**. Grab bars and any wall or other surfaces adjacent to grab bars shall be free of sharp or abrasive elements and shall have rounded edges. The space around the grab bars shall be as follows:
    a. 1-1/2" between the grab bar and the wall.
    b. 1-1/2" minimum between the grab bar and projecting objects below and at the ends.
    c. 12" minimum between the grab bar and projecting objects above.

C. Certifications
D. Field Samples
E. Mock-ups
F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING
A. Packing, Shipping, Handling, and Unloading
1. Deliver and handle materials and products in strict compliance with manufacturer's instructions and recommendations.
2. Deliver items in manufacturer's original unopened protective packaging.
B. Acceptance at Site
C. Storage and Protection
1. Store and handle materials and products in strict compliance with manufacturer's instructions and recommendations.
2. Protect from damage.
3. Store materials in original protective packaging to prevent soiling, physical damage or wetting.
4. Maintain protective covers on all units until installation is complete. Remove covers at final clean-up of installation.
D. Waste Management and Disposal

1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
A. Manufacturer's standard term warranty for materials and workmanship.

1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS
- A. Wall Mounted Waste Receptacle
  1. Bobrick Washroom Equipment, Inc., 6901 Tujunga Avenue, North Hollywood, CA 91605, or equal.
  2. American Specialties, Inc., 441 Saw Mill River Road, Yonkers, NY 10701
  3. Bradley Corporation, W142 N9101 Fountain Boulevard, Menomonee Falls, WI 53051

2.02 EXISTING PRODUCTS
2.03 MATERIALS
2.04 MANUFACTURED UNITS
- A. Wall Mounted (Surface-Mounted) Waste Receptacle
  1. Manufacturer's Model:
     a. (Bobrick) B-277
     b. (Bradley) 3565
     c. (ASI) 20826
  2. Size: 15-inch W x 23-inch H (Nominal)
  3. Material: 18-8, Type 304 stainless steel, 20-gauge
  4. Finish: Satin

2.05 EQUIPMENT
2.06 COMPONENTS
2.07 ACCESSORIES
2.08 MIXES
2.09 FABRICATION
2.10 FINISHES
2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.01 INSTALLERS
3.02 EXAMINATION
- A. Site Verification of Conditions
  1. Check wall opening for correct dimensions, plumbness of blocking or frames, and other preparation that would affect installation of accessories.
  2. Check areas to receive surface-mounted items for conditions that would affect quality and execution of work.
  3. Verify spacing of plumbing fixtures and toilet partitions that affect installation of accessories.
  4. Do not begin installation of washroom accessories until openings and surfaces are acceptable.

3.03 PREPARATION
3.04 ERECTION
3.05 INSTALLATION
- A. Install products in strict compliance with manufacturer's written instructions and recommendations, including the following:

1. Verify blocking has been installed properly.
2. Verify location does not interfere with door swings or use of fixtures.
3. Comply with manufacturer's recommendations for backing and proper support.
4. Use fasteners and anchors suitable for substrate and project conditions
5. Install units rigid, straight, plumb, and level, in accordance with manufacturer's installation instructions and approved shop drawings.
6. Fit flanges of accessories snug to wall surfaces. Provide caulking in gaps between 90 degrees. return flanges and finish wall surface after accessories are installed.
7. Conceal evidence of drilling, cutting, and fitting to room finish.
8. Test for proper operation.

3.06 APPLICATION
3.07 CONSTRUCTION
3.08 REPAIR/RESTORATION
3.09 RE-INSTALLATION
3.10 FIELD QUALITY CONTROL
3.11 ADJUSTING
3.12 CLEANING

A. Clean exposed surfaces of compartments, hardware, and fittings using methods acceptable to the manufacturer.

3.13 DEMONSTRATION
3.14 PROTECTION

A. Touch-up, repair or replace damaged products until Substantial Completion.

3.15 SCHEDULES

END OF SECTION

SECTION 26 10 00
GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. This specification shall apply to all phases of Work hereinafter specified, shown on Drawings, or as required to provide a complete installation of electrical systems for this Project. Work required under this specification, is not limited to just the Electrical Drawings - refer to Architectural, Structural, Landscape, and Mechanical / Plumbing Drawings, as well as all other drawings applicable to this project, which designate the scope of work to be accomplished. The intent of the Drawings and Specifications is to provide a complete and operable electrical system that includes all documents that are a part of the Contract.

1. Work Included. Furnish labor, material, services and skilled supervision necessary for the construction, erection, installation, connections, testing, and adjustment of all circuits and electrical equipment specified herein, or shown or noted on Drawings, and its delivery to the Owner complete in all respects ready for use.
2. The electrical Work includes installation or connection of certain materials and equipment furnished by others. Verify installation details, installation and rough-in locations from the actual equipment or from the equipment shop drawings.

B. Electrical Drawings. Electrical Drawings are diagrammatic, and are intended to convey the scope of work, indicating intended general arrangement of equipment, conduit and outlets. Follow Drawings in laying out Work and verify spaces for installation of materials and equipment based on actual dimensions of equipment furnished.

1.02 QUALITY ASSURANCE

A. Design, manufacture, testing and method of installation of all apparatus and materials furnished under requirements of these specifications shall conform to latest publications or standard rules of the following:

- Institute of Electrical and Electronic Engineers - IEEE
- National Electrical Manufacturers' Association - NEMA
- Underwriters' Laboratories, Inc. - UL
- National Fire Protection Association - NFPA
- Federal Specifications - Fed. Spec.
- American Society for Testing and Materials - ASTM
- American National Standards Institute - ANSI
- California Electrical Code - CEC
- National Electrical Safety Code - NESC
- Insulated Cable Engineers Association - ICEA

- American Institute of Steel Construction - AISC
- State and Municipal Codes In Force In The Specific Project Area
- Occupational Safety and Health Administration (OSHA)
- Electronics Industries Association/ Telecommunications Industry Association (EIA/TIA)
- California Electrical Code (where adopted)
- Local Authority Having Jurisdiction (AHJ) Published Electrical Standards and Codes

B. Perform Work in accordance with the California Electrical Code, applicable building ordinances, and other applicable codes, hereinafter referred to as the "Code." The Contractor shall comply with the Code including local amendments and interpretations without added cost to the Owner. Where Contract Documents exceed minimum requirements, the Contract Documents take precedence. Where code conflicts occur, the most stringent shall apply unless variance is approved.

1. Comply with all requirements for permits, licenses, fees and codes. Permits, licenses, fees, special service costs, inspections and arrangements required for the Contractor at his expense shall obtain Work under this contract, unless otherwise specified.
2. Comply with requirements of the applicable utility companies serving this Project. Make all arrangements with utility companies for proper coordination of Work.

1.03 GENERAL REQUIREMENTS

A. Guarantee: Furnish a written guarantee for a period of one-year from date of acceptance.

B. Wherever a discrepancy in quantity or size of conduit, wire, equipment, devices, circuit breakers, etc., (all materials), arises on the Drawing and/or Specifications, the Contractor shall be responsible for providing and installing all material and services required by the strictest condition noted on Drawings and/or in Specifications to ensure complete and operable systems as required by the Owner and Engineer.

C. All Core Cutting, Drilling, and Patching:

1. For the installation of work under this Section, the aforementioned shall be performed under this Section of the Specifications and the Concrete section of the Specifications.
2. No holes will be allowed in any structural members without the written approval of the Project's Structural Engineer.
3. For penetrations of concrete slabs or concrete footings, the work shall be as directed in the Concrete Section of Specifications.
4. The contractor shall be responsible for patching and repairing surfaces where he is required to penetrate for work under this contract.
5. Penetrations shall be sealed to meet the rated integrity of the surface required to be patched and repaired. The patched surface

shall be painted or finished to match the existing surface.

D. Verifying Drawings and Job Conditions:

1. This Contractor shall examine all Drawings and Specifications in a manner to be fully cognizant of all work required under this Section.
2. This Contractor shall visit the site and verify existing conditions. Where existing conditions differ from Drawings, adjustment shall be made and allowances included for all necessary equipment to complete all parts of the Drawings and Specifications.

1.04 WORK IN COOPERATION WITH OTHER TRADES

A. Examine the Drawings and Specifications and determine the work to be performed by the electrical, mechanical and other trades. Provide the type and amount of electrical materials and equipment necessary to place this work in proper operation, completely wired, tested and ready for use. This shall include all conduit, wire, disconnects, relays, and other devices for the required operation sequence of all electrical, mechanical and other systems or equipment.

B. Provide a conduit only system for low voltage wiring required for control of mechanical and plumbing equipment described in this or other parts of the Contract Documents. Install all control housings, conduits and backboxes required for installing conductors and wire to the controls.

C. Install separate conduits between each heating, ventilating and air conditioning sensing device and its control panel and/or control motor. Before installing any conduit for heating, ventilating and air conditioning control wiring, verify the exact requirements from the control diagrams provided with the equipment manufacturer's shop drawings.

1.05 TESTING AND ADJUSTMENT

A. Upon completion of all electrical work, this Contractor shall test all circuits, switches, motors, breakers, motor starter(s) and their auxiliary circuits and any other electrical items to ensure perfect operation of all electrical equipment.

B. Equipment and parts in need of correction and discovered during such testing, shall be immediately repaired or replaced with all new equipment and that part of the system shall then be retested. All such replacement or repair shall be done at no additional cost to the Owner.

C. All circuits shall be tested for continuity and circuit integrity. Adjustments shall be made for circuits not complying with testing criteria.

D. All certified testing reports should be submitted to the Engineer at completion of project.

1.06 IDENTIFICATION

A. Identification nameplates shall be Micarta 1/8" thick and of approved size, with beveled edges and engraved white letters 1/4" high minimum on black background. Nameplates shall be provided for all circuits in the distribution switchboards, and selector switches. Provide nameplates on all switchboards, panelboards and transformers to correlate with the Single Line Diagram. Inscriptions on equipment shall be identical to those indicated in panels and/or motor control centers and other similar devices. Each nameplate shall be attached to the equipment by epoxy. The inscriptions in each nameplate shall be as indicated on the Drawings.

B. Identification of Air Conditioning Equipment: Equipment to be so identified shall include, but shall not be limited to: switches; starters/controllers; motors and boxes or cans housing other control items. Nameplates shall have letters a minimum of 3/8" high.

C. Plates: All cover and device plates shall be furnished with engraved or etched designations under any one of the following conditions:

1. Three gang or larger gang switches.
2. Lock switches.
3. Pilot light switches.
4. Switches in locations from which the equipment or circuits controlled cannot be readily seen.
5. Manual motor starting switches.
6. Switches that serve other than lighting loads.
7. Where so indicated on the drawings.
8. As required on all control circuit switches, such as heater controls, etc.
9. Where receptacles are other than standard duplex receptacles to indicate voltage and phase.

D. See wiring device section of this specification for wiring device plate cover labeling requirements.

E. See drawings for panel board schedule directory requirements.

F. See conduit installation section of this specification for conduit labeling requirements.

1.07 FINAL INSPECTION AND ACCEPTANCE

A. After all requirements of the Specifications and/or the Drawings have been fully completed, representatives of the Owner will inspect the work. Contractor shall provide competent personnel to demonstrate the operation of any item or system to the full satisfaction of each representative.

B. Final acceptance of the work will be made by the Owner after receipt of approval and recommendation of acceptance from each representative.

C. Prepare the following items and submit to the Architect before final

acceptance:

1. Two (2) copies of all test results as required under this section.
2. Two (2) copies of local and/or state codes enforcing authority's final inspection certificates.
3. Copies of as-built record drawings as required under the General Conditions, pertinent Division One sections and Basic Electrical Requirements.
4. Two (2) copies of all receipts transferring portable or detachable parts to the District when requested.
5. Notify the Architect in writing when installation is complete and that a final inspection of this work can be performed. In the event any defect or deficiencies are found during this final inspection, they shall be corrected to the satisfaction of the Architect before final acceptance can be issued.
6. Two (2) copies of the as-built/existing conditions site plan.

D. The Contractor shall complete the following work before any electrical equipment is energized.

1. All equipment shall be permanently anchored.
2. All bus connections shall be tightened per manufacturer's instructions and witnessed by the Owner's representative or inspector.
3. All ground connections shall be completed and identified. Perform and successfully complete all required megger and ground resistance tests.
4. All feeders shall be connected and identified.
5. The interiors of all electrical enclosures including busbars and wiring terminals shall be cleaned of all loose material and debris, paint, plaster, cleaners or other abrasive's overspray removed and equipment vacuumed clean. The Owner's Representative or inspector shall observe all interiors before covers are installed.
6. All dry wall work and painting shall be completed within the main electrical room.
7. All doors to electrical equipment rooms shall be provided with locks in order to restrict access to energized equipment.
8. Electrical rooms shall not be used as a storage room after power is energized.
9. The coordination study for the power distribution system shall be complete, circuit breakers ground relays set, tested and calibrated accordingly.

1.08 RECORD DRAWINGS

A. Drawings of Record: The Contractor shall provide and keep up-to-date, a complete record set of blueprints. These shall be corrected daily and show every change from the original Drawings. This set of prints shall be kept on the job site and shall be used only as a record set. This shall not be construed as authorization for the Contractor to make changes in the layout without definite instruction in each case. Upon completion of the

work, a set of reproducible Contract Drawings shall be obtained from the General Contractor and all changes as noted on the record set of prints shall be incorporated thereon with black ink in a neat, legible, understandable and professional manner. Refer to the Supplementary General Conditions for complete requirements.

1.09 APPROVALS, EQUALS, SUBSTITUTIONS, ALTERNATIVES, NO KNOWN EQUAL

A. Approvals: Where the words (or similar terms) "approved", "approval", "acceptable", and "acceptance" are used, it shall be understood that acceptance by the Owner, Architect and Engineer are required.

B. Equal: Where the words (or similar terms) "equal", "approved equal", "equal to", "or equal by", "or equal" and "equivalent" are used, it shall be understood that these words are followed by the expression "in the opinion of the Owner, Architect, and Engineer. For the purposes of specifying products, the above words shall indicated the same size, made of the same construction materials, manufactured with equivalent life expectancy, having the same aesthetic appearance / style (includes craftsmanship, physical attributes, color and finish), and the same performance.

C. Substitution: For the purposes of specifying products "substitution" shall refer to the submittal of a product not explicitly approved by the construction documents / specifications.

1. Substitutions of specified equipment shall be submitted and received by the Engineer ten (10) days prior to the bid date for review and written approval. Regulatory Agency approval for all substitutions will be the sole responsibility of the contractor. To receive consideration, requests for substitutions must be accompanied by documentary proof of its equality with the specified material. Documentary proof shall be in letterform and identify the specified values/materials alongside proposed equal values/materials. In addition, catalog brochures and samples, if requested, must be included in the submittal. ONLY PRE-BID APPROVED PRODUCTS, ISSUED VIA A FORMAL BID ADDENDUM TO ALL BIDDERS, WILL BE ALLOWED ON THE PROJECT. REGARDLESS OF THE APPROVAL ON ANY SUBSTITUTION, ALL BIDS SHALL BE BASED ON THE PRODUCTS EXACTLY AS SPECIFIED. PRICING FOR EACH APPROVED SUBSTITUTION SHALL BE INCLUDED IN THE BID SUBMITTAL AS A SEPARATE LINE ITEM.
2. In the event that written authorization is given for a substitution, after award of contract, the Contractor shall submit to the Engineer quotations from suppliers / distributors of both the specified and proposed equal material for price comparison, as well as a verification of delivery dates that conform to the project schedule.
3. In the event of cost reduction, the Owner will be credited with 100 percent of the reduction, arranged by Change Order.
4. The Contractor warrants that substitutions proposed for specified items will fully perform the functions required.

D. Alternates \ Alternatives: For the purposes of specifying products, "alternatives / alternates" may be established to enable the Owner / Architect / Engineer to compare costs where alternative materials or methods might be used. An alternate price shall be submitted in addition to the base bid for consideration. If the alternate is deemed acceptable, written authorization will be issued.

E. No Known Equal: For the purposes of specifying products, "No Known Equal" shall mean that the Owner / Architect / Engineer is not aware of an equivalent product. The Contractor will need to submit a "Substitution" item, per the requirements listed above, if a different product is proposed to be utilized.

1.10 SHOP DRAWINGS / SUBMITTALS

A. Shop Drawings / Submittals shall be submitted in six (6) bound sets accompanied by Letter of Transmittal, which shall give a list of the number and dates of the drawings submitted. Drawings shall be complete in every respect and bound in sets.

B. The Shop Drawings / Submittals submitted shall be marked with the name of the project, numbered consecutively and bear the approval of the Contractor as evidence that the Contractor has checked the Drawings. Any Drawings submitted without this approval will be returned to the Contractor for resubmission.

C. If the shop drawings show variations from the requirements of the Contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variations in his letter of transmittal. If the substitution is accepted, the Contractor shall be responsible for proper adjustment that may be caused by the substitution. Samples shall be submitted when requested.

D. Only products listed as "Equal" within the contract documents, along with formally approved "Substitutions" will be reviewed. Products not conforming to these items will not be reviewed and will be returned to the Contractor for re-submittal.

E. Review comments used in response to shop drawings / submittals are:

- "No Exception Taken" Product approved as submitted.
- "Furnish As Corrected"Re-submittal not required, although the contractor is to provide the submitted product with corrections as noted.
- "Revise And Resubmit" Re-submittal required with corrections as noted.
- "Rejected" Re-submittal required based upon the originally specified product.

F. Shop drawings shall be submitted on the following but not limited to:

- Lighting fixtures.
- Switchgear / Distribution Boards, Motor Control Centers and Panelboards complete with overcurrent device information.
- Transformers.
- Fire alarm System/Central Monitoring System.
- Wiring Devices.
- Lighting Control System / Dimming System Products.
- Pullboxes and Underground Vaults
- Terminal Cabinets
- Lighting Inverters, UPS's, PDU's, Generators, ATS's, Inverters, TVSS Systems
- Cable Tray, Flexible Cable tray and Cable Runway
- Power Poles and Floor Boxes
- Coordination Study
- All other products called out on drawings that call for shop drawing submittal.

1.11 MAINTENANCE, SERVICING, INSTRUCTION MANUALS AND WIRING DIAGRAMS

A. Prior to final acceptance of the job, the Electrical Contractor shall furnish to the Owner at least six (6) copies of operating and maintenance and servicing instructions, as well as six (6) complete wiring diagrams for the following item(s) or equipment:

- Lighting Control System / Dimming Systems.
- Fire alarm system.
- Transformers.
- Panelboards.
- Switchgear / Distribution Boards.
- Lighting Inverters, UPS's, PDU's, Generators, ATS's, Inverters, TVSS Systems

B. All wiring diagrams shall specifically cover the system supplied. Typical drawings will not be accepted. Four (4) copies shall be presented to the Owner.

1.12 INTERRUPTION OF SERVICE OR SERVICE SHUTDOWN:

A. All electrical services in all occupied facilities of the contract work are to remain operational during the entire contract period. Any interruption of the electrical power for the performance of this work shall be at the convenience of the District and performed only after consultation with the District. Work involving circuit outages shall be only at such a time and of such duration as approved in writing. Work involving power outages for the work required to connect new equipment and disconnect existing equipment shall be performed at the convenience of the District.

B. Work involving system outages to the building data, fire alarm, intrusion detection, telephone, computer, intercommunications, energy

management, television, or clock systems shall be performed only after consultation with the District and shall be only at such a time and of such duration as approved in writing.

C. Provide overtime work, double shift work, night time work, Saturday, Sunday, and holiday work to meet outages schedule.

D. Provide temporary electrical power to meet the requirements of this Article.

E. Any added costs to the contractor due to necessity of complying with this Article shall be included in the Contract scope of work.

F. When electrical work involving power disruptions to existing areas is initiated, the work shall proceed on a continuous basis without stopping until electric power is restored to the affected areas.

G. The Contractor shall request in writing to the District a minimum of three weeks in advance for any proposed electrical outage.

1.13 POWER, TELEPHONE AND OTHER SERVICES

A. GENERAL

1. Power and metering facilities shall conform to the requirements of the serving utility companies. Contractor shall verify service locations and requirements prior to bid.

2. Conform to all requirements of the serving utility companies. Locations of structures and routing of service conduits indicated on the drawings are approximate and shall be verified with the serving utility company prior to installation. Installation of service shall not begin until approved drawings have been received from the serving utility company.

3. Within 30 calendar days of receipt of notice that the contract has been awarded, the Contractor shall notify the New Business Departments of the District Office of the serving utility companies and shall provide information as requested by the serving utility company. The Contractor shall furnish at the same time information as to the estimated completion date of job or the date when the respective utility company circuits, will be ready for installation, energizing and activation of the service.

4. In addition to the requirements of the serving utility companies, all power, telephone and cable service conduits for utility companies shall be completely encased with concrete.

5. Perform all work for electric power, cable television and public telephone services in accordance with the requirements of said companies and/or city departments. Services shall be complete to the point of connection as designated by the serving utility

company.

6. Prior to bid date, Contractor shall consult utility company and verify all service locations, utility company and/or city requirements. Include costs in the bid for all work required.

7. Coordinate hook-up of final service with utility company or city so as to cause no delay in the progress of the work. Include the cost of overtime, off-hours and weekend work as may be required.

8. Notify the Architect immediately of any major changes required to the work of this section as a result of said utility company and/or city requirements.

9. Interrupting capacity of the main circuit breaker and distribution circuit breakers shall be equal to or greater than available short circuit current at said point as obtained by utility company or as computed by the Engineer. Selective coordination between main and feeder circuit breakers is required.

B. INSTALLATION

1. Service conduits shall terminate at service poles or other service points as indicated by the serving utility company and shall extend underground to main service terminating pull section as indicated. All bends in conduits shall be long radius type and all sweeps shall have a radius of not less than 10 times conduit trade size. Underground conduits shall be encased in concrete 3" thick on all sides with multiple conduits spaced not less than 1-1/2" apart.

2. Service cable, if overhead, shall be connected to metering compartment of switchboard or, if underground, in service terminating pull section as required and directed by utility company.

3. Provide grounding/bonding including ground rods at utility service equipment per serving utility company requirements.

C. STRUCTURAL CONDITIONS

1. Where conduits are to pass through or interfere with any structural member, where notching, boring or cutting of structure is necessary, where special openings are required through walls, floors, footings, or other building elements, to accommodate electrical work, all such work shall be done as directed and approved by Architect/Structural Engineer of Record.

2. Placement of conduits in concrete slabs and structural members shall comply with requirements of applicable section of CCR, Title 24, Public Works and shall be approved by the Architect.

3. Where a concrete encasement for underground conduits abuts a foundation wall or underground structure which conduits enter, encasement shall be maintained in position in relation to structure, or shall extend down to footing projection, or shall be doweled into structure. Underground structures shall include manholes, pull boxes, vaults and buildings.

4. All cutting and patching of rough and finish construction work shall be done as required for installation of work under this section. Patching shall be of same materials, workmanship and finish and shall accurately match the surrounding work. Work shall be done under direction of the architect.

1.12 PERMITS, FEES AND INSPECTIONS

A. Obtain and pay for all permits and licenses required for the electrical work, and arrange and schedule all required inspections. Obtain permits prior to commencing any work.

B. Pay all fees or charges levied by the utility company or city for permanent and temporary services to the project, and any other imposed fees.

1.13 BELOW GRADE UTILITY DETECTION

A. The Contractor shall obtain the services of a company engaged in the business of detection of existing below grade utilities to identify and document existing utilities in the areas of the new work. Services shall be provided utilizing the latest detection equipment available. The company obtained shall have been engaged in the business of below grade utility detection for the past five years. Services are available from Underground Technology Incorporated at (800) 366-7801.

B. Existing below grade utilities and their locations may or may not be indicated by these documents or may be partially indicated at what is believed to be the approximate location(s). The information has not been independently verified by the District or the District's Representatives. The Architect and the Architect's Consulting Engineers are not responsible for the locations of existing below grade utilities and the accuracy of said information. The Contractor shall verify and identify the existing utilities in the areas of the new work and take the necessary steps to avoid damage to existing utilities. In addition, the Contractor shall identify existing said below grade utilities and formulate the best trenching route(s) for the new installation. No trenching/excavation shall take place until this has been verified.

C. In conjunction with the below grade utility detection, the Contractor shall prepare and provide a scaled site plan indicating the locations of all below grade utilities encountered and identified. The "as-built/existing condition" site plan shall be turned over to the District as part of the Close-out package.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials and Equipment: All electrical materials and equipment shall be new and shall be listed by Underwriter's Laboratories and bear their label, or listed and certified by a nationally recognized testing authority where UL does not have an approval. Custom made equipment must have complete test data submitted by the manufacturer attesting to its safety.

B. Switchboards / Distribution Boards / Motor Control Centers:

1. See general single line notes on single line drawing for more information.

C. Panel boards - Branch Circuit:

1. See drawings for panel board schedules and specifications.

D. Transformers:

1. See drawings for transformer schedules and specifications.

E. Lighting Fixtures:

1. See drawings for lighting fixture and lamp schedules and additional specifications. Furnish, install and connect a lighting fixture at each outlet where a lighting fixture type symbol (designated on plans) is shown as being installed. Each fixture shall be complete with all required accessories including sockets, glassware, boxes, spacers, mounting devices, fire rating enclosure and lamps.

2. Ballasts: See lighting fixture schedule notes. All noisy ballasts shall be replaced at no cost to the Owner.

3. Sockets shall be General Electric, Bryant, or equal, white, twist-turn contact type. Push contact type sockets will not be allowed.

4. Lamps: See lamp / fixture schedule and lamp / lighting fixture schedule notes.

5. Fixtures shall be furnished and installed with required mounting devices and accessories.

6. All lighting shall be individually supported and properly anchored to roof or floor above.

7. Locations of fixtures shall be per the architectural reflected ceiling plan and shall be coordinated at time of rough in. Conflicts between

the architectural reflected ceiling plan and the electrical plans shall be brought to the attention of the Architect, in writing, prior to ordering fixtures.

F. Wiring Devices:

1. Provide wiring devices indicated per plan. Devices shall be specification grade. Acceptable manufactures are Leviton, Pass & Seymour and Hubbell. Provide all similar devices of same manufacturer, unless indicated otherwise. All device colors shall be from the full range of manufacturer standard color options as selected by the architect. This selection will be made during the shop drawing review process. Convenience receptacles shall be 20 Amp (not 15 Amp).

2. Wiring Devices (Decora)

Receptacle #16352- WHITE

I.G. Receptacle#16362-IG- WHITE

G.F.C.I. Receptacle #6899- WHITE
Simplex Receptacle #16351- WHITE
Recessed Clock Receptacle #5361-CH- WHITE (Non-Decora)
Single Pole Switch #5691-2- WHITE
Double Pole Switch #5692-2- WHITE
Three Way Switch #5623-2- WHITE
Four Way Switch #5624-2- WHITE
Pilot Light Switch "On" #5628-2- WHITE
Pilot Light Switch "Off" #5631-2- WHITE
Projection Screen Switch #5657-2- WHITE
Keyed Switch #1221-2L WHITE (Non-Decora)
Door Jam Switch #1865-BRASS

3. I.G. (isolated ground) receptacle bodies shall be of a basic color specified above with an orange triangle to symbolize isolated ground.

4. When shown circuited with an I.G. conductor, receptacles shall be of an I.G. type. As an example, a NEMA L6-30R denoted on the plans and shown circuited with an I.G. conductor shall be an I.G. version of that receptacle.

5. Wiring devices located in wood finished areas shall generally be black unless otherwise indicated by the architect.

6. Wiring devices shall generally be white with stainless steel cover plates unless otherwise indicated by the Architect.

7. All wiring device plates on the project shall be labeled with panel and circuit number(s) utilizing a Brother P-Touch labeling system utilizing 1/2" tape (yellow on black) or equal by Herman-Tellerman or Panduit.

Locate label on the concealed side of the wiring device plate. Handwritten labels are unacceptable.

8. The following device plates shall be engraved:
   a. Key operated switches, switches with Pilot Lights and Switches for the control of motors, heaters and ventilators. Engraving shall be black and occur on the exposed side of the plate and indicate the motor, heater, or ventilator controlled.
   b. Receptacles on generator and/or UPS power shall have custom stamped plates with the words "generator" or "UPS" in black letters.

G. Weatherproof Outlet Covers/Assemblies: All Receptacles identified as weatherproof on the drawings shall be weather-resistant, tamper-resistant, GFCI type and equipped as follows:

1. Type WP-A: Recessed wall box with a hinged, lockable, cast aluminum, self-closing, gasket-equipped door that is wet location-listed rain tight while "in use". Unit shall comply with CEC, Article 406.9(A) and (B). UON on drawings, provide a minimum of 2 separate compartments suitable for installation of power receptacles, AV or communications outlets. Additionally, unless otherwise noted on drawings, provide the following:

   a. A 20A weather-resistant, tamper-resistant, GFCI duplex receptacle in the first compartment. Provide branch circuiting per plans.
   b. A blank metal plate suitable for field installation of power, AV or communications devices in the second compartment.
   c. Where indicated on plans as requiring data, AV, or other low voltage service outlet, provide minimum 3/4" C.O. with pull string routed from the second compartment to nearest low voltage pull box. Where shown mounted in a building wall, any blank/unused compartment shall be equipped min. 3/4" C.O. with pull string routed to the nearest accessible ceiling space.
   d. See wiring device section of this specification for additional wiring device plate cover labeling requirements.
   e. 1 key minimum per device (minimum of 2 per project) to the Owner's project manager upon completion of project.
   f. Custom color powder coat finish as selected by Architect - Include all costs in base bid for same.
   g. In locations with sufficient wall depth, provide 6" wide x 6" tall x 5-1/2" deep recessed wall box (C.W. Cole #TL310-WCS-K1-CUSTOM COLOR).
   h. In locations utilizing shallow stud walls construction or other walls of insufficient depth, provide 10-3/4" wide x 7-3/8" tall x 3-7/8" deep recessed wall box (C.W. Cole #TL310-WCS-SH-K1 -CUSTOM COLOR).
   i. See drawings for additional details.

2. Type/Subscript WP-B: Wet location-listed raintight while "in use" cast copper-free aluminum lockable cover with baked aluminum lacquer finish and one gang, weather-resistant, tamper-resistant GFCI receptacle. Hubbell WP26E series. Polycarbonate covers are unacceptable. Unit shall comply with CEC, Article 406.9(A) and (B). Contractor shall powder coat cover assembly to a custom color where receptacle locations are deemed by the Architect to be in aesthetically sensitive or public spaces. Custom color as selected by Architect.

3. Type WP-C: (C.W. Cole #TL310-WCS-PED-ADA-K1-CUSTOM COLOR or #TL310-WCS-PED-K1-CUSTOM COLOR) pedestal device box with a hinged, lockable, cast aluminum, self-closing, gasket-equipped door that is wet location-listed raintight while "in use". Unit shall comply with CEC, Article 406.9(A) and (B). UON on drawings, provide a minimum of 2 separate compartments suitable for installation power receptacles, AV or communications outlets. Additionally, unless otherwise noted on drawings, provide the following:

   a. A 20A weather-resistant, tamper-resistant, GFCI duplex receptacle in the first compartment. Provide branch circuiting per plans.
   b. A blank metal plate suitable for field installation of power, AV or communications devices in the second compartment.
   c. Where indicated on plans as requiring data, AV, or other low voltage service outlet, provide minimum 3/4" C.O. with pull string routed from the second compartment to nearest low voltage pull box.
   d. See wiring device section of this specification for additional wiring device plate cover labeling requirements.
   e. 1 key minimum per device (minimum of 2 per project) to the Owner's project manager upon completion of project.
   f. Include all costs in base bid for ADA version (22.5" tall) of pedestal box. Prior to ordering material, contractor shall coordinate with Architect and/or AHJ to determine which pedestal box locations do not require ADA compliance and may be changed to the standard (11.5" tall) version of the pedestal box.
   g. Custom color powder coat finish as selected by Architect. Include all costs in base bid for same.
   h. See drawings for additional details.

G. Motor Controllers / Starters: See drawings for motorized equipment schedules and specifications.

H. Circuit Breakers:

1. Service entrance circuit breakers smaller than 400 Amp frame shall be thermal-magnetic trip with inverse time current characteristics unless otherwise indicated below. Service entrance main circuit breakers, 400 Amp frame and larger shall be 100% rated, solid-

state type as outlined in this specification. All other service entrance circuit breakers, 400 Amp frame and larger, shall be 100% rated, solid-state type outlined in this specification.

2. All non-service entrance circuit breakers 225 Amp and larger shall be thermal magnetic type and have continuously adjustable magnetic pick-ups of approximately 5 to 10 times trip rating. Breakers shall have easily changed trip rating plugs with trip ratings as indicated on the Drawings. Rating plugs shall be interlocked so they are not interchangeable between frames. Additionally, all non-service entrance circuit breakers, 600 Amp frame and larger, located in 480v 3 phase, 3-wire or 277/480v, 3 phase 4-wire switchgear, distribution boards or panel boards, shall be solid state, 100% rated. Breaker shall have built-in test points for testing long delay and instantaneous, and ground fault (where shown) functions of the breaker by means of a 120-volt operated test kit. Contractor to provide the use of a test kit capable of testing all breakers 400 Amp and above - at the Engineers request.

3. All non-service entrance circuit breakers less than 225 Amp shall be molded plastic case, air circuit breakers conforming to UL 489. Provide breakers with thermal magnetic trip units, and a common trip bar for two- or three-pole breakers, connected internally to each pole so tripping of one pole will automatically trip all poles of each breaker. Provide breakers of trip-free and trip-indicating bolt-on type, with quick-make, quick-break contacts. Provide single two- or three-pole breaker interchangeability. Provide padlocking device for circuit breakers as shown on the Drawings.

4. Where a Current Limiting Circuit Breaker (CLCB) is indicated on drawings or as required elsewhere in this specification, provide a U.L. listed current limiting thermal magnetic circuit breaker(s) u.o.n. An independently operating limiter section within a molded case is not allowed. Coordinate CLCB ratings as required to protect electrical system components on the load side of the CLCB to include, but not limited to, protecting automatic transfer switches, panel boards and lighting control panels.

5. Where a solid-state circuit breaker is indicated on drawings or as required elsewhere in this specification, provide a solid-state circuit breaker with minimum five function complete with built-in current transformers. The five functions shall be independently adjustable and consist of Overload/Long Time Amp Rating, Long Time Delay, Short Time Delay, Short Circuit/Instantaneous Pickup, but may also include Shunt Trip and/or Ground Fault if so indicated on the Drawings. Rating plugs shall be interlocked so they are not interchangeable between frames. Breaker shall have built-in test points for testing long delay and instantaneous, and ground fault (where shown) functions of the breaker by means of a 120-volt operated test kit. Contractor to provide the use of a test kit capable of testing all breakers 400 Amp and above - at the

Engineers request.

6. Ground Fault Interrupting Breakers. Provide where shown molded plastic case, air circuit breakers, similar to above with ground fault circuit interrupt capability, conforming to UL Class A, Group 1.

7. Tandem or half-sized circuit breakers are not permitted.

8. Series Rated Breakers. UL listed series rated combinations of breakers can be used to obtain panelboard-interrupting ratings shown on Drawings. If series rated breakers are used, switchboards, distribution boards and panel boards shall be appropriately labeled to indicate the use of series rated breakers. Shop drawing submittal shall include chart of U.L. listed devices, which coordinate to provide series rating.

9. Circuit breakers shall be standard interrupting construction. Panelboard shall accept standard circuit breakers up to 225 amperes. Provide HACR ratings for all circuit breakers serving motor loads.

10. Circuit breaker handle accessories shall provide provisions for locking handle in the on or off position.

11. Shunt trip equipped circuit breakers shall be provided on all elevator feeders.

12. Temperature compensating circuit breaker(s) shall be provided when located in outdoor enclosure(s) or when located in an enclosure subject to high ambient heat due to due nearby industrial processes etc.

13. Provide 75 degree Celsius-rated conductor lugs/lug kits as required on all circuit breakers to accept conductor quantities and sizes shown on drawings.

14. All circuit breaker terminations shall be suitable for use with 75 degrees Celsius ampacity conductors.

I. Disconnect Switches:

1. Non-fusible or fusible, heavy-duty, externally operated horsepower-rated, 600V A.C. Provide NEMA 3R, lockable enclosures for all switches located on rooftops, in wet or damp areas and in any area exposed to the elements.

2. Fusible switches shall be Class “R”.

3. Amperage, Horsepower, Voltage and number of pole per drawings. All of which shall be clearly marked on the switch nameplate.

4. Provide the Owner’s project manager with one spare set of fuses

and two sets of fuse clips/fuse for every set of fuses on the project.

J. Fuses:

1. Provide fuses at all locations shown on the Drawings and as required for supplemental protection.

a. Fuses shall be manufactured by Bussman, Shawmut, or equal.

b. All fuses shall be the product of a single manufacturer.

2. Main and Feeder Protection.

a. Where rating of protective device is greater than 600A, provide Bussman Hi-Cap fuses, Class L, current limiting, having an interrupting rating of 200,000A RMS.
b. Where rating of protective device is 600A or less, provide Bussman Class R fuses, Class RKI current limiting fuses, having an interrupting rating of 200,000A RMS.

3. Motor Protection.

a. Where rating of protective device is 600A or less, provide Bussman Low-Peak, Class RKI Dual-element, current-limiting fuses having an interrupting rating of 200,000A RMS.
b. Where rating of protective device is 600A or less, provide Bussman Fusetron Dual-Element fuses, Class RK5, having an interrupting rating of 200,000A RMS.
c. Where fuses feeding motors are indicated but not sized, it shall be the responsibility of the Contractor to coordinate the fuse size with the motor to provide proper motor running protection.
d. When rejection type fuses are specified (Class RK1 or RK5) the fuse holder of all switches (specified in other Sections) shall be suitable for the fuses provided.

K. Cable Tray, Flexible Cable Tray and/or Cable Runway:

1. See drawings for Cable Tray, Flexible Cable Tray and/or Cable Runway specifications.

L. Lighting Control Systems:

1. See drawings for Lighting Control Systems schedules and specifications.

2. See drawings for occupancy sensors and photosensors.

M. Conduit:

1. Galvanized Rigid Conduit (GRC) shall be full weight threaded type steel. Steel conduit shall be protected by overall zinc coating to inside and outside surfaces, applied by the hot dip, metallizing, or sherardizing process.

2. Intermediate Metal Conduit (IMC), shall be hot-dipped galvanized in accordance with UL 1242 and meeting Federal Specification WWC-581 (latest revision).

3. Electrical Metallic Tubing (EMT) shall be zinc-coated steel with baked enamel or plastic finish on inside surfaces. EMT shall be dipped in a chromic acid bath to chemically form a corrosion-resistant protective coating of zinc chromate over galvanized surface.

4. Flexible metal conduit shall be constructed of hot-dipped galvanized steel strips wound spirally with interlocking edges to provide greatest flexibility with maximum strength. Interior surfaces shall be smooth and offer minimum drag to pulling in conductors. Use only as directed in writing by the Engineer with the exception of 400 Hz feeders and 400 Hz branch circuits which shall be run in flexible aluminum conduit.

5. Liquid-tight conduit (Seal-Tite) shall be galvanized steel flexible conduit as above except with moisture and oil-proof jacket, pre-cut lengths and factory-installed fittings. For outdoor installations and motor connections only unless otherwise noted on drawings.

6. Factory assembled, or off-site assembled wiring systems (such as Metal Clad (MC) Cable, Type AC Cable, Type NM Cable, Type BX Cable, etc...) shall not be used.

7. Non-Metallic Conduit:
   a. Polyvinyl chloride (PVC) rigid conduit, Schedule 40, Type II for underground installation only with solvent welded joints, conforming to Underwriters Laboratories, Inc. (U.L.) requirements, listed for exposed and direct burial application.
   b. Conduit and fittings shall be produced by the same manufacturer.

N. Fittings:

1. Condulet type fittings shall be smooth inside and out, taper threaded with integral insulating bushing and of the shapes, sizes and types required to facilitate installation or removal of wires and cables from the conduit and tubing system. These fitting shall be of metal, smooth inside and out, thoroughly galvanized, and sherardized cadmium plated.

2. Metallic condulet covers shall have the same finish as the fitting

and shall be provided for the opening of each fitting where conductors do not pass through the cover.

3. Connector, coupling, locknut, bushings and caps used with rigid conduit shall be steel, threaded and thoroughly galvanized. Bushings shall be insulated.

4. U.O.N. all EMT fittings, connectors and couplings installed in concealed locations, areas not considered to be wet or damp locations by the AHJ, or areas not subject to physical damage, shall be steel, zinc or cadmium plated, threadless, compression, steel locking ring type with insulated throat. Where suitable for use, steel set screw fittings are allowed for trades sizes of 2" and smaller. Insulated throat is not required for fittings, connectors and couplings 1" and smaller.

5. All interior and exterior EMT fittings, connectors and couplings, 2" and smaller, installed in exposed or concealed locations that are considered by the AHJ to be wet or damp locations, shall be raintite-listed, steel zinc or cadmium plated, threadless, compression, steel locking ring type with insulated throat. If raintite-listed, steel, zinc or cadmium plated, threadless, compression, steel locking ring type with insulated throat. If raintite-listed, EMT fittings, connectors and couplings are unavailable for a given trade size or if conduit is installed in an area subject to damage – provide rigid metallic or intermediate metallic conduits, fittings, connectors and couplings as required.

6. Flexible steel conduit connectors shall be or malleable iron clamp or squeeze type or steel twist-in type with insulated throat. The finish shall be zinc or cadmium plating.

7. Conduit unions shall be "Erickson" couplings, or approved equal. The use of running threads will not be permitted.

O. 600 Volt Conductors - Wire and Cable:

1. All conductors shall be copper. Provide stranded conductor for #10 AWG and larger or when making flexible connections to vibrating machinery. Use compression "fork" type connectors or transition to solid conductors when connecting to switches, receptacles, etc.

2. Type THHN/THWN-2 thermoplastic, 600 volt, UL approved, dry and wet locations rated at 90 degrees Celsius, for conductors of all sizes from #12 AWG up to and including 1000 kcmil. RHH/RHW insulation is allowed only to provide an Electrical Circuit Protective System to comply with CEC Articles 695 and 700.

3. Wire and cable shall be new, manufactured not more than six (6) months prior to installation, shall have size, type of insulation, voltage rating and manufacturer's name permanently marked on

outer covering at regular intervals.

4. Wire and cable shall be factory color-coded by integral pigmentation with a separate color for each phase and neutral. Each system shall be color-coded and it shall be maintained throughout.

5. Systems Conductor Color Coding:

   a. Power 208/120V, 3PH, 4W:
      (1) Phase A = Black
      (2) Phase B = Red
      (3) Phase C = Blue
      (4) Neutral= White
      (5) Switchlegs= Purple (Switchlegs shall also be identified separately by numerical tags).
      (6) Travelers = Purple with Black stripe.

   b. Power 480/277V, 3PH, 4W:
      (1) Phase A = Brown
      (2) Phase B = Orange
      (3) Phase C = Yellow
      (4) Neutral= Grey
      (5) Switch legs= Purple (Switchlegs shall also be identified separately by numerical tags).
      (6) Travelers = Purple with black stripe.

   c. Ground Conductors: Green
   d. Isolated Ground Conductors: Green with continuous yellow stripe.
   e. Fire Alarm System: As recommended by the manufacturer.

6. All color-coding for #12 thru #6 AWG conductor shall be as identified above. Conductors #4 AWG and larger shall be identified with utilizing phase tape at each termination.

7. No conductors carrying 120 volt or more shall be smaller than #12 AWG.

8. Aluminum conductors shall not be used.

9. Wire-pulling compounds used as lubricants in installing conductors in raceways shall only be "Polywater J". No oil, grease, graphite, or similar substances may be used. Pulling of No. 1/0 or larger conductors shall be done with an approved cable pull machine. Other methods; e.g. using vehicles and block and tackle to install conductors are not acceptable.

P. Medium Voltage Conductors (greater than 600V):

1. See drawings for Medium Voltage Cable Schedule and

Specifications.

Q. Junction and Pullboxes:

1. For interior dry locations, boxes shall be galvanized one-piece drawn steel, knockout type, with removable, machine screw secured covers.

2. For outside, damp or surface locations, boxes shall be heavy cast aluminum or cast iron with removable, gasketed, non-ferrous machine screw secured covers.

3. All boxes shall be sized for the number and sizes of conductors and conduits entering the box and equipped with plaster rings where required.

R. Concrete Pull Boxes and Manholes:

1. Each concrete pre-cast section shall be identified by having the manufacturer's name and address cast into an interior face or permanently attached thereto. Associated Concrete Products-Quickset, Brooks Products or equal.

2. Structure Construction:
   a. The pre-cast steel reinforced concrete structure walls, floor and roof shall safely sustain the loads and pressure resulting from vertical and lateral earth loadings and vehicular loadings.
   b. Pre-cast structure shall be designed to withstand forces due to additional inward load of 4,000 lbs. (working load) with safety factor of 2, acting perpendicular to the surface at any pulling iron.
   c. Structures shall be single piece or horizontal multi-section construction as required for field installation conditions. Multi-sections shall interlock with "Tongue and groove" joint mating surfaces to insure a rigid assembly.
   d. All structure pre-cast joints shall be sealed with preformed cold field applied plastic joint sealing compound. Joint sealing compound shall not leak, sag or flow at the joints with 10 psi water pressure applied for 24 hours. Chemically resistant to acid, alkalies and saturated hydrogen sulfide.
   e. Each pre-cast structure section shall have suitable knockouts or openings in the vertical walls for the duct banks and conduits entering the structure. Provide a 1" diameter knockout in each corner of the floor slab, 6" from adjacent walls, for installation of ground rods.
   f. Pullboxes shall have deep recess conduit knockout concrete extensions at two opposite end walls. Additional shallow recess knockouts shall be provided on the other two walls for conduit entrances.

g. Pullboxes shall be provided on precast concrete 6" extension grade ring "tongue and groove" mating surfaces to insure rigid assembly.

h. Pullbox sizes shall be as indicated on drawings but in no case less than required by applicable codes. Minimum depth of the pullbox shall not be less than 42".

i. The pullbox floor sump shall extend through the concrete floor into the gravel bedding, below the pullbox.

j. Cover and frame assemblies:

1) Traffic rated cover shall be hot dip galvanized steel flush fitting with threaded flush, slotted head, and stainless steel studs.

2) Top ring frame shall be hot dip galvanized steel angle frame where the pullbox is installed in paving or concrete work. Assembly shall be rated for H-20 bridge loading.

3) Top ring frame shall be armor bank type where the pull box is installed in exposed earth or landscaping. Assembly shall be rated fro H-10 loading.

4) Covers for 2'-0" x 3'-0" pullboxes shall be a single plate assembly Quikset TE-1000 series or equivalent.

5) Covers for pullboxes larger than 2'-0" x 3'-0" shall be a double leaf, torsion spring-assisted hinged assembly. Quikset TL-400 Series or equivalent.

6) Covers shall be permanently marked in the cover metal as follows:

a) "E" or "Electric" for covers on structures containing power circuits under 600 volts and "HV" or "high voltage" for covers on structures containing power circuits over 600 volts.

b) "Signal" for covers containing signal circuits.

k. Furnish complete with galvanized pull irons, cable racks, hooks and porcelain insulator cable cradles.

l. Provide a drainage sump, 6" diameter minimum, with a cast iron grate over the sump. Extend to gravel bedding below.

3. Manholes:

a. The pre-cast concrete roof of each manhole shall be provided with a 36" minimum diameter opening, and shall be equipped with necking ring suitable for installation of cover assembly. Provide pre-cast concrete manhole grade ring(s) to bring the top of the cover to the required elevation. Concrete grade ring(s) shall be of sufficient height to provide 24" minimum finish earth cover over the top of the manhole roof. Rings shall be tongue and groove mating surfaces to insure rigid assembly.

b. A pre-cast concrete grade ring cone shall set on top of the grade ring(s) to support the cast iron cover ring.

c. Ladders shall be hot dip galvanized steel; length as required for manhole depth. Cast iron ladders' swing joint retaining hook and grade ring steps shall be provided in the manhole necking grade rings. Provide a ladder for each manhole.
d. Manhole sizes shall be as indicated on drawings. Dimensions are inside clear, but in no case shall the manhole inside height floor to ceiling be less than 7'-0" and minimum length and width shall not be less than 6'-0" x 8'-0".
e. 30" diameter clear opening, flush fitting in cover frame ring.
f. Cover frame ring shall be cast iron and attach to the pre-cast concrete grade ring cone with ½" diameter inserts and adjustable slotted head, threaded stainless steel studs, minimum of four.
g. Provide two lifting "Eye" holes in cover.

S. Outlet Boxes:

1. For fixtures, boxes shall be galvanized, one-piece drawn steel, knockout type equipped with 3/8" fixture studs and plaster rings where required.

2. For convenience outlets, wall switches, or other devices, outlet boxes shall be galvanized one-piece drawn steel, knockout type 4" x 4"x 1-1/2" minimum size with plaster rings as required.

3. For locations where standard boxes are not suitable due to number and size of conduit to be terminated, special boxes shall be designed to fit space or meet other requirements and submitted for approval.

4. For exposure to weather, damp locations, or surface mounting, outlet boxes shall be heavy cast aluminum or cast iron with threaded hubs; covers shall be watertight with gaskets and non-ferrous screws.

5. See drawings for floor box installation notes and specifications.

T. Plywood Backboards: Where indicated for telephone or communications system terminals or other equipment assemblies, provide backboards of size indicated. Use 3/4" thick x 8' tall (length per plans), Douglas Fir, void-free, kiln-dried, fire-rated plywood finished on one side and prime coat painted on all surfaces with finish coat of enamel paint, color by architect. Leave one (1) fire-rating stamp/sheet exposed for inspection.

U. Terminal Cabinets:

1. Terminal cabinets shall be fabricated of hot dipped galvanized code gauge sheet metal for flush or surface mounting, complete with barriered sections, a door for each vertically barriered section and sizes as indicated on plan. Doors shall be hinged and lockable. Locks shall be keyed to match the branch circuit panelboards.

Terminal cabinet trims shall match the branch circuit panels.

2. Provide each terminal cabinet with a full size plywood backboard.

3. Terminal cabinets shall be installed complete with full-length skirts of the same construction and finish as the terminal cabinet.

4. Where mounted outdoors, terminal cabinets shall be NEMA 3R, weatherproof complete with gaskets and required sealant to prevent moisture from entering the terminal cabinet.

5. All terminal cabinets and terminal cabinet barriered sections shall be labeled by the cabinet or cabinet section use (i.e. CATV, Security, etc). Labels shall be Micarta type as specified elsewhere in these specifications. Unless otherwise noted, all termination blocks and cables shall be labeled per ANSI/EIA 607 standard.

V. Painting: Terminal cabinets, panels, junction boxes, pull boxes, etc., and conduit installed in public view shall be painted with colors selected by the Architect to match the subject surface. Refer to painting section of the specifications for additional requirements.

W. Seismic Design and Anchoring of Electrical Equipment:

1. Seismic Protection Criteria: All Electrical and Mechanical machinery installations provided, as part of this contract located in any Seismic Risk Zone of the California Building Code Seismic Risk Map shall be protected from earthquakes in accordance with the 2025 CBC and ASCE 7-10 Chapter 13 and, as applicable, the state and local building codes and regulations. Protection criteria for these zones shall be a Horizontal Force Factor as prescribed by the CBC multiplied by the machinery weight considered passing through the machinery center of gravity in any horizontal direction. Unless vibration isolation is required to protect machinery against unacceptable structure transmitted noise and/or vibration, machinery shall be protected from earthquakes by rigid structurally sound attachment to the load supporting structure. The force factor and anchorage shall be determined by calculations performed and submitted to the Architect by a registered California professional engineer (civil or structural) hired by the contractor. The Contractor shall be responsible for the design of seismic restraint systems for all pieces of equipment weighing over 50 pounds including but not limited to the following:

   a. Switchgear
   b. Conduits/Conduit support trapezes
   c. Transformers
   d. Panels
   e. Light Fixtures
   f. UPS, PDU and Generator Equipment
   g. Cable Tray / Flexible Cable Tray/ Ladder Tray

h. Bus Duct

2. Seismic protection, labor, materials and design shall be included in the Contract sum.

X. Trenching and Backfilling: Contractor shall be responsible for trenching and backfilling. Refer to Trenching and Backfilling section of the specifications for complete requirements.

Y. Relays, Contactors, and Timeswitches

1. Individual Control Relays (HVAC/Plumbing Control Functions)

a. Individual control relays shall have convertible contacts rated a minimum of 10 amperes, 600 volts regardless of usage voltage. Coil voltage, number and type of contacts shall be verified and supplied to suit the specific usage as shown in the wiring diagrams and/or schedules on the electrical, mechanical and plumbing specifications and drawings. Coil control circuit shall be independently fused, sized to protect coil. Relays shall be installed on prefabricated mounting strips. Each relay shall have a surge supreme to limit coil transient voltages. Furnished in the NEMA Type 1 enclosure unless indicated otherwise.

b. The following relays are approved:

Manufacturer	Type
Cutler Hammer	M-600
General Electric	CR120BP
Square D Co.	Class 8501, Type X
Allen Bradley	700N

2. Contactors and/or Relays

a. Contactors and/or relays for control of lighting and/or feeders and/or panels shall be 600 volt AC, electrically operated, mechanically held units, open type for panel mounting with number of poles and of size as indicated on the drawings. Provide auxiliary control relay for operation of each contactor and/or relay with a two-wire and./or three wire control circuit as described on the plans.

b. Contactors and/or relays shall be mounted in panelboards in barriered section under separate hinged lockable doors or in contactor and/or relay cabinets as called for on the drawings. Contactors and/or relays shall be installed on Lord sound absorbing rubber mounts.

c. Contactors and/or relays shall be Automatic Switch Co. (ASCO) Bulletin #920 Series for 2 and 3 pole, and Automatic Switch Co. Bulletin 917 Series for contactors and/or relays containing 4 or more poles. Coil control circuit shall be independently fused, sized to protect coil.

d. Contactors and/or relays shall be equipped with a switch, in the proper configuration, to disconnect the control circuit controlling the coil of the respective device. Control circuit disconnect switch shall be labeled showing function of device.

3. Timeswiches

a. All timeswitches shall be Intermatic #ET70215C.
b. All timeswitches shall be mounted in separate section in top of panelboards or in separate enclosure unless otherwise indicated on drawings. Clear opening for timeswitch shall be a minimum of 12" x 12".
c. System shall include lighting contactors as indicated complete with auxiliary control relays so as to be compatible, with the output of the time controller.

4. Photocell with rating of 2000 watts, 16.6 amps, 120V, 60Hz AC. Suitable for -30° Fahrenheit to 158° Fahrenheit and weatherproof. Load to remain "ON" in case of cell failure and a time delay of 15 seconds Tork 2001/2002 Series or Paragon CW201 Series or equivalent unless herein specified otherwise, photocell to face north.

5. Contactors and/or Relays/Timeswitch Cabinet:

a. Each contactor, relay, and/or timeswitches not indicated to be mounted in electrical panels shall be mounted in a cabinet, size as required, with hinged lockable door keyed same as panelboards. Construction of cabinet shall be similar to terminal cabinets.
b. Contactor cabinets shall be of the same manufacturer as the panelboards.
c. Where relays and/or contactors occupy the same enclosure as timeswitches they shall have a clear acrylic shield installed over each relay or contactor to guard live exposed parts from accidental contact by non-authorized personnel.

6. Control Power Transformer – Provide low voltage, 60HZ control power transformers, VA as required for HVAC controls.

Z. Manual Motor Starters

1. Provide flush or surface mounting manual motor starters with number of poles and size of thermal overload heaters as required for the motor being controlled (equipped with overload heaters, one for each motor lead). Back boxes shall be supplied with all flush mounting starters whether they are toggle type requiring only a 4" square outlet box or the larger type requiring a special box and cover designed to accept the particular unit.

2. Unless otherwise noted non the drawings, all manual starters for

single phase motors, smaller than 1 hp, shall be the compact toggle type. Manual starters for all single phase motors, 1 to 5 hp, and all three phase motors up to 5 hp. Shall be the heavy duty type.

3. Where manual motor starter is shown with pilot light, the pilot light shall be installed in a separate outlet box adjacent to the starter outlet, and engraved nameplate to indicate function of pilot light.

4. Motor starters as manufactured by the following:

	Single Phase	
Manufacturer	1 hp and Below	Others
Arrow Hart	Type RL	Type LL
General Electric	CR 101	Class CR 1062
I.T.E.	Class C10, C11, C12	Class C20
Square D Co.	Class 2510, Type A	Class 2510, Type B & C
Allen Bradley	Equivalent	Equivalent

AA. Duct Sealant

1. Dottie LHD Series or equivalent.

BB. Firestop Sealant

1. 3M company fire seal / fire barrier / firestop system Hilti Inc., Wiremold or equivalent. System shall be UL listed for type of structure penetrated, element penetrating structure and maintain the fire rating of the structure penetrated. System shall be approved by the authorities having jurisdiction.

CC. Apparatus Supports

1. Swing connectors for steel rods supporting hanging electrical equipment (transformers, junction boxes, etc.) shall be equal to Steel City E-165, E-170, and E-232.

DD. Conduit Supports on Roofs

1. Supports for conduits routing exposed across roofs of buildings and covered walkways shall be Erico Caddy #PP Series Pipe Pier Supports or equivalent.

EE. Concrete Work

1. Portland Cement:
   a. ASTM C33-67, Type II, Low Alkali Cement. Composed of Portland cement, coarse aggregate, fine aggregate, and water.

1) Prepare concrete for use as electrical equipment footings, lighting pole bases and equipment slabs on grade, in accordance with pertinent sections of Specification Section 03300.
2) Concrete for duct/conduit encasement, shall be 2.00 sacks of concrete per cubic yard of 3/8" pea gravel slurry. Provide a minimum of ten (10) pounds of red oxide concrete coloring powder per cubic yard of concrete.
3) Mix shall obtain a 6" slump, measured with standard slump cone per ASTM C145-58.

b. Coarse Aggregate: Uniformly graded between maximum size not over 1-1/2" and not less then ¾" and minimum size #4, crushed rock or washed gravel. For concrete encased ducts only, maximum aggregate size shall be ½".

c. Fine Aggregate: Clean, natural washed sand of hard and durable particles varying from fine to particles passing 3/8" screen, of which at least 12% shall pass 50 mesh screen.

2. Water: Clean and free from deleterious quantities of acids, alkalis, salts, or organic materials.

3. Reinforcement:

a. All reinforcing steel shall be placed in conformance with 2025 CBC.
b. Reinforcing bars shall conform to 2025 CBC.
c. All reinforcing bar bends shall be made cold.
d. Welded wire fabric shall conform at A.S.T.M. A-185.

4. Form Material: For exposed work, use PS 1-66 "B-B Concrete Form" plywood forms, or equal. Elsewhere, forms may be plywood, metal, or 1" x 6" boards. Forms for round lighting pole bases shall be sono-tube. Provide sandblast finish to eliminate sono-tube swirl lines in concrete.

PART 3 - EXECUTION

3.01 PREPARATION AND INSTALLATION

A. Installation of Conduit and Outlet Boxes:

1. All conduit installed in the dry walls or ceilings of a building shall be steel tube (EMT), aluminum tube (EMT), or Intermediate Metal Conduit (IMC). Flexible conduit shall not be used in lieu of EMT, IMC or rigid conduit except as noted herein.
2. Galvanized rigid conduit (GRC) or intermediate metal conduit (IMC) shall be used as follows:

- when noted on the drawings.

- when considered exposed to damage by the local AHJ.

- when installed in wet or damp locations and of a trade size where listed-raintite fittings, connectors, couplings etc. are unavailable.

- when required by CEC Article 517.13.

- when installed in concrete and masonry. The use of ENT in t walls and parking structures may be allowed only as directed in writing by the Engineer. Request for ENT substitution must be made prior to bid and in accordance with pre-bid substitution requests requirements of these specifications.

3. Intermediate metal conduit (IMC), is approved for use in all locations as approved for GRC or EMT and in accordance with CEC Article 342.

4. Flexible steel conduit shall only be permitted to be used at light fixture outlets and connections to vibrating electrical equipment. All flexible steel conduit runs shall be less than 6'-0". All outdoor installation shall be made using liquid-tight flex with approved fittings. Include a separate insulated green ground conductor sized per CEC in each conduit. Other uses of flexible conduit shall be allowed only as approved in writing by the Engineer.

5. Flexible liquidtight conduit shall be installed in lieu of the flexible steel; where required by the CEC, in damp and wet location, where exposed to weather, in refrigerated area (65°F or less), and/or between seismic joints. All rotating electrical equipment shall be supplied with flexible, liquid-tight conduit with appropriate slack and shall not exceed thirty-six (36) inches. Include a separate insulated green ground conductor sized per CEC in each conduit. Other uses of liquidtight flexible conduit shall be allowed as approved in writing by the Engineer on a case by case basis.

6. Rigid metallic conduit installed underground or embedded in concrete shall be 1" trade size minimum and shall be wrapped with 20 mil. Polyvinyl chloride plastic tape, PVC conduit installed underground or embedded in concrete shall be 3/4 " minimum trade size.

7. Conduit shall be run so as not to interfere with other piping fixtures or equipment.

8. The ends of all conduit shall be cut square, carefully reamed out to full size and shall be shouldered in fitting.

9. No running threads will be permitted in locations exposed to the weather, in concrete or underground. Special union fittings shall be used in these locations.

10. Where conduit is underground, under slabs or grade, exposed to the weather, or in wet locations, make joints liquid tight and gas tight.

11. All metal conduit in masonry and concrete and where concealed under floor slabs shall have joints painted with thread compound prior to makeup.

12. PVC conduit shall not be run in walls.

13. Where conductors enter a raceway or a raceway in a cabinet, pull box, junction box, or auxiliary gutter, the conductors shall be protected by a plastic bushing type fitting providing a smoothly rounded insulating surface.

14. Where conduit extends through roof to equipment on roof area, this Contractor shall provide flashing material compatible with the roofing system as required by the roofing specifications or as required by the Owner's roof warranty. This flashing shall be delivered to the roofing contractor for installation. The actual location of all such roof penetrations and outlets shall be verified by the Architect/Owner. Contractor to verify type of flashing prior to bid and include all costs.

15. All conduit shall be supported at intervals not less than 6'-0" and within 12" from any outlet and at each side of bends and elbows. Conduit supports shall be galvanized, heavy stamped, two-hole conduit clamp properly secured.

16. Where conduit racks are used the rack shall consist of two piece conduit clamps attached to galvanized steel slotted channels, properly secured via threaded rods attached directly to the building structure.

17. Nail-in conduit supports will not be allowed. One-piece setscrew type conduit clamps or perforated iron for supporting conduit will not be permitted.

18. Seismic Conduit Support:

    a. All conduit shall be supported in such a manner that it is securely attached to the structure of the building. Attachment is to be capable of supporting the tributary weight of conduit and contents in any direction. Maximum spacing of support and braces are to be as follows:

CONDUIT SIZE	MAXIMUM SPACING

1/2" to 3"	6'-0"
3-1/2" to 4"	8'-0"

19. All conduit runs shall be installed parallel or perpendicular to walls, structural members, or intersection of vertical planes and ceilings. Field made bends and offset shall be avoided where possible. Crushed or deformed raceway shall not be installed.

20. Open knockouts in outlet boxes only where required for inserting conduit.

21. Locate wall outlet of the same type at same level in all rooms, except where otherwise noted.

22. Outlet boxes on metal studs shall be attached to metal hangers, tack welded or bolted to studs; on wood studs attachment shall be with wood screws, nails not acceptable.

23. Recessed boxes shall not be mounted back-to-back in any wall; minimum offset shall be 24 inches.

24. Junction Boxes that do not contain any device(s) shall be located in storage rooms, electrical closets, or above accessible ceilings, not in hard lid ceilings or other forms of inaccessible ceilings. Place boxes which must be exposed to public view in a location approved by the Owner's Project Manager. Provide covers or plates to match adjacent surfaces as approved by the Owner's Project manager.

25. Surface mounted panels secured to stud walls shall be secured to wall using 1/2" x 3" screws into steel backing plate as detailed by the Architect.

26. Sleeves shall be installed where conduit passes through masonry or concrete walls and shall be 24 gauge galvanized steel no more that 1/2" greater in diameter than the outside diameter of the conduit. When located in non-rated structures , caulk conduit sleeve with stone wool and waterproof below grade. When located in fire rated structures, provide U.L. listed fire stopping system. See fire stopping section of this specification for additional requirements.

27. All boxes shall be covered with outlet box protector, Appleton SB-CK, or similar device / method to keep dirt / debris from entering box, conduit or panels. If dirt / debris does get in, it shall be removed prior to pulling wires.

28. All boxes installed outdoors shall be suitable for outdoor installations, gasketed, screw cover and painted as directed by the Architect with weatherproof paint to match building.

29. All conduit entries to outdoor mounted panels, cabinets, boxes, etc., shall be made using Myers "SCRU-TITE" hubs Series ST.

30. Provide nylon or a 1/8-inch O.D. polyethylene rope, rated at 250 pounds tensile strength, in all conduits more than 5 feet in length left empty for future use. Not less than 5 feet of rope shall be left at each end of the conduit. Tag all lines with a plastic tag at each end indicating the termination/stub location of the opposite end of the conduit.

31. All multiple conduit runs within suspended ceilings shall be suspended from building structure by means of unistrut hangers/racks, Conduit shall not be allowed to lay on ceiling or be supported from ceiling suspension wires or other suspension system. Support conduit to structure above suspended ceilings 8" minimum above ceiling to allow removal of ceiling tile. Maintain two-inch clearance above recessed light fixtures

32. All exposed conduits and support hardware shall be painted to match the finish of the wall or ceiling to which it is supported.

33. Where conduits or wireways cross seismic joints, provide approved flexible conduit connection or approved expansion/deflection fitting to allow for displacement of conduit in all three axes. Connection shall allow for movement in accordance with design of seismic joint. Non-flexible raceways crossing expansion joints or other areas of possible structural movement shall make provision for 3-way movement at such points by means of expansion/deflection fittings. Fittings shall be installed in the center of their axes of movement and shall not be deflected to make part of a conduit bend, or compressed or extended to compensate for incorrect conduit expansion/deflection fittings(s) complete with ground jumpers.

34. Where necessary, provide approved expansion joints to allow for thermal expansion and contraction of conduit(s). Install expansion joints complete with ground jumpers.

35. Seal all conduits where termination is subject to moisture or where conduit penetrates exterior wall, floor or roof, in refrigerated areas, classified (hazardous areas) and as indicated on the drawings.

36. Except as otherwise indicated on the Drawings or elsewhere in these specifications, bends in feeder and branch circuit conduit 2 inches or larger shall have a radius or curvature of the inner edge, equal to not less than ten (10) times the internal diameter of the conduit. Except where sweeping vertically into a building where sweep radius equals 10x conduit diameter, underground communications and building interconnect conduits 3 inches or larger shall have a minimum 12’-6” radius or curvature of the inner edge. For the serving utilities, radius bends shall be made per their respective specifications. In special circumstances where structural footing conditions prohibit the 10 times bend radius, it is acceptable to

reduce to 6 times

37. Tag all empty conduits at each accessible end with a permanent tag identifying the purpose of the conduit, footage end-to-end, and the location of the other end. In wet, corrosive outdoor or underground locations, use brass, bronze, or copper 16 gauge tags secured to conduit ends with #16 or larger galvanized wire. Inscribe on the tags, with steel punch dies, clear and complete identifying information.

38. The following additional requirements shall apply to underground conduits:

    a. Underground conduit shall be Schedule 40 PVC (polyvinyl chloride) unless otherwise indicated elsewhere in these specifications or as required per CEC Article 517.13.

    b. For all communications conduits, 2" and larger, and where feeders are 100 amps or greater, provide with a minimum 3" inch, (2,000 LB) concrete envelope, 2" inch minimum separation between conduits, installed at depth of not less than 24" below grade. (Provide concrete encasement and/or greater minimum conduit depth as required by the Utility Companies.) Conduit separation within a duct bank shall be maintained using plastic spacers located at 5'-0" intervals. Where power and communication conduits are run in a common trench, a 12" inch minimum separation shall be maintained between power and communication conduits or as required by Utility Companies.

    c. In all cases, where any conduit(s) pass under a building slab or footing, the electrical contractor will provide a Bentonite clay or concrete barrier that conforms to the height and width of the trench excavation and is a minimum of 18" thick. In all cases, where conduit(s) pass thru a sleeve in a footing or other foundation element, the electrical contractor will provide a Bentonite clay or concrete barrier between the sleeve and the conduit(s) surrounding the conduit(s) for the entire depth of the sleeve. The barrier is required to prevent passage of moisture under or thru the slab or footing via the trench or sleeve. Provide caution tape 12" below finish grade on all conduits unprotected by concrete.

    d. Where underground conduit passes under a building slab, concrete encasement may not be required, except as required above, contact the Engineer for written direction prior to omitting any encasement.

    e. Underground conduits, which terminate inside building(s) below grade, such as in a basement level, or which slope so

that water might flow into interior building spaces, shall be sealed at the point of penetration with a modular conduit seal (Link-Seal or equal by Rox Systems). Conduit/conduit sealing system penetrations of waterproofing membranes/systems on existing structures shall be completely restored as required to maintain membrane/system manufacturer and installer warrantee for the installation. All conduits shall be provided with a 4% slope away from buildings. All conduits shall be installed such that the water cannot accumulate in the conduit and such that water drains into the nearest manhole, pull box or vault – not into the facility. In instances where grade changes or elevation differences prevent sloping of conduit away from a building into the nearest manhole, pull box or vault or where accumulation of water in a manhole, pull box or vault may result in water traveling into the facility, conduits shall be sealed internally at each end of each conduit using conduit sealing bushing, sized as required for the conductors contained within the conduit (O-Z Gedney #CSBG 100psig withstand or equal). In all cases, install plugs or caps in spare (empty) conduits at both ends of each conduit (Jackmoon or equal) able to with seal both water and gas from entering the facility via the conduits.

f. Include a separate insulated green ground conductor sized per CEC in each conduit.

g. All underground conduits with circuits rated at 40 amps or greater and all underground communications conduits shall be provided with a metallic marker tape located 12 inchs below the finished grade.

h. Where underground conduits sweep into/thru slabs, utilize PVC 90 degree sweeps that transition, via female PVC adapter to GRC coupling mounted flush in slab. GRC couplings shall be 1/2 lap taped with 20-mil tape. If the distance of the conduit run between a sweep and the next connecting sweep, pullbox, vault or manhole exceeds 150 ft then the sweep shall be concrete encased. Exceptions:

    1) Communications conduits shown terminating at a finished floor shall have an additional 4" high GRC nipple equipped with a bushing, removable conduit plug, labeling tag and pull rope. Tie off pull rope to conduit plug.
    2) Utility conduit sweeps shall be installed per the requirements of the respective utility company.

i. All PVC conduit shall be glued for a water and gas tight installation. The contractor shall use appropriate solvent on all joints prior to gluing conduit together.

B. Installation of 600-Volt Conductors:

1. All electrical wire, including signal circuits, shall be installed in conduit.

2. All circuits and feeder wires for all systems shall be continuous from over current protective device or switch to terminal or farthest outlet. No joints shall be made except in pull, junction or outlet boxes, or in panel or switchboard gutters.

   a. Utilize preinsulated "winged" spring type connectors, 3M Company "Performance Plus" #O/B or #R/Y as required for splices and taps in conductors No. 6 AWG and smaller. When a spring connector is used in an underground environment or when subject to moisture, utilize a 3M Company Scotchcast 3507G epoxy resin connector sealing pack to seal the spring connector.

   b. Wires No 4 AWG and larger AWG shall be joined together as follows:

      1) When located in an underground environment or when subject to moisture, the splice shall be made with compression connector and sealed by a 3M, or equal, PST cold shrink connector insulator.
      2) When located in an interior environment, the splice shall be made with an Ilsco or equal dual rated, insulated splice-reducer connector or multi-tap connector-listed for use with 75/90 degree Celsius rated conductors.

   c. Connections to busbar shall be made with dual-rated copper/aluminum one-piece compression lugs. Paralleled conductor connections shall be by mechanical lugs.

3. Thoroughly clean all conduit and wire-ways and see that all parts are perfectly dry before pulling any wires.

4. Install UL approved fixture wire from all lighting fixture lamp sockets into fixture outlet or junction box.

5. For 20 ampere branch circuit wiring, increase No. 12 conductors to No. 10 for 120 volt circuits longer than 100 feet and for 277 volt circuits longer than 150 feet.

6. Conductor Support. Provide conductor supports as required by codes and recommended by cable manufacturer. Where required, provide cable supports in vertical conduits and provide lower end of conduit with a ventilator.

C. Occupancy Sensors:

1. It shall be the contractor's responsibility to locate and aim sensors in the correct location required for complete and proper volumetric coverage per the manufacturer's recommendations. Rooms shall have ninety (90) to one hundred (100) percent coverage and shall accommodate all habits of single or multiple occupants at any location within the room. The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms that are to be provided with sensors. The contractor shall provide additional sensors as required to properly and completely cover the respective room. Additionally, it may be necessary for the contractor to make adjustments, change the location or type of sensor to obtain proper operation in a specific room. The contractor shall have final responsibility for proper operation of the system in each room and should therefore make labor allowances for changes and adjustments.

2. Where wall switches are indicated in combination with occupant sensors, switches shall be connected to the load side of occupant sensors, this will permit the sensor to operate and enable the occupants to turn off the lights in the room. Where noted, provide bi-level switching and connect as shown on the drawings.

3. Ceiling mounted sensors should be located in the space to be covered, a minimum of 4', preferable 5' away from the latch side of the door, 2" to 3" away from the wall and 3' to 4' from an air supply register, do not mount sensors over a doorway or behind a full height door. Sensors shall be aimed in the direction of the space to be covered. Do not aim sensors toward a doorway.

4. Unless otherwise noted on the drawings, all sensors shall be adjusted for a time delay of ten minutes.

5. It is the contractor’s responsibility to arrange a pre-installation meeting with the manufacturer's factory authorized representative, at the owner's facility, to verify placement of sensors and installation criteria.

6. Proper judgment must be exercised in executing the installation so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components. The contractor shall also provide, at the owner’s facility, the training necessary to familiarize the owner's personnel with the operation, use, maintenance, adjustment, and problem solving diagnosis of the occupancy sensing devices and systems.

7. Upon completion of the installation, the system shall be completely commissioned by the manufacturer's factory authorized technician who will verify all adjustments and sensor placement to ensure a trouble-free installation.

8. As part of the "record drawings" indicate on the reflected ceiling plan the exact location (ceiling tile or access panel) of each power pack and slave unit.

D. Grounding / Bonding:

1. Provide grounding and bonding for entire electric installation as shown on plans, as listed herein and as required by applicable codes. Included, but not limited to, are items that require grounding / bonding:

   a. Conduit, Raceways and Cable Trays.
   b. Neutral or identified conductors of interior wiring system.
   c. Panelboards and Switchboards.
   d. Non-current carrying metal parts of fixed equipment.
   e. Telephone distribution equipment.
   f. UPS, PDU, ATS and Generator Systems
   g. Raised Flooring
   h. Antennas
   i. Lightning Protection Systems

2. Use of Ground Rods: Furnish and install required number of 3/4" x 10' copper clad ground rods to meet specified resistance, all required grounding wires, conduit and clamps. The size of the grounding conductors shall be not less than that set forth in the latest edition of the California Code of Regulations, Title 24, State of California CEC unless otherwise indicated. Rods shall be installed such that at least 10 feet of length is in contact with the soil. Where rock bottom is encountered, the electrode shall be driven at an oblique angle not to exceed 45 degrees from vertical or shall be buried in a trench that is at least 30 inches deep. The upper end of the electrode shall be flush with or below ground level unless the aboveground end and the grounding electrode conductor attachments are protected against physical damage. Unless otherwise noted, connection to the grounding electrode conductor may be by compression type or exothermic process connector. Mechanical connectors shall not be used.

3. Grounding System Connection:

   a. Compression connectors shall be unplated copper, manufactured by Burndy, or approved equal, designed specifically for the intended connection.

   b. Exothermic weld-type connectors shall be 'Cadweld' manufactured by Erico Products, or approved equal, designed specifically for the intended connection.
   c. Mechanical connectors shall not be used.

4. Isolated Ground Receptacles shall have an insulated ground wire

connected between the receptacle and the panelboard isolated ground bus. Unless otherwise noted, this ground wire shall not be grounded at any other point, and shall be distinguished from other ground wires by a continuous yellow stripe.

5. Provide separate green equipment ground conductor in all electrical raceways, to effectively ground all fixtures, panels, controls, motors, disconnect switches, exterior lighting standards, and noncurrent carrying metallic enclosures. Use bonding jumpers, grounding bushings, lugs, busses, etc., for this purpose. Connect the equipment ground to the building system ground. Use the same size equipment ground conductors as phase conductors, up through No. 10 AWG. Use CEC Table 250-122 for conductor size with phase conductors No. 8 and larger, if not shown on the Drawings.

6. Clean the contact surfaces of all ground connections prior to making connections.

7. Ductwork. Provide a flexible ground strap, No. 6 AWG equivalent, at each flexible duct connection at each air handler, exhaust fan, and supply fan, and install to preclude vibration.

8. Motors. Connect the ground conductor to the conduit with an approved grounding bushing, and to the metal frame with a bolted solderless lug. Bolts, screws and washers shall be bronze or cadmium plated steel.

9. Building grounding system resistance to ground shall not exceed 25 ohms.

E. Line Voltage and Low Voltage Power Supplies to all Mechanical Equipment Including Plumbing, Heating and Air Conditioning Units;

1. An electric power supply, including conduit, any necessary junction and/or outlet boxes and conductors and connection shall be furnished and installed by this Contractor for each item or mechanical equipment.

2. Power supplies to individual items of equipment shall be terminated in a suitable outlet or junction box adjacent to the respective item of equipment, or a junction box provided by the manufacturer or the equipment and directed by the Mechanical Contractor. Allow sufficient lengths of conductor at each location to permit connection to the individual equipment without breaking the wire run.

3. The location of all conduit terminations to the equipment is approximate. The exact location of these conduit terminations shall be located and installed as directed by the Mechanical and Plumbing Contractor.

4. Provide power supplies to all plumbing and mechanical equipment, including but not limited to, equipment furnished and installed by Owner or Contractor such as heating and air conditioning equipment, pumps, boilers, auto valves, water coolers, trap primers etc. The installation shall produce a complete and operable system.

5. Unless otherwise noted, this Contractor shall furnish and install all conduit, boxes, wires, etc., for line voltage wiring and low voltage wiring.

6. It is the Contractor's responsibility to verify with the Drawings of other trades regarding the extent of his responsibility for mechanical equipment. The bid must include a sum sufficient to cover the cost of the installation.

7. The location of all power supply connection and/or terminations to the mechanical equipment is approximate. The exact locations of these terminations shall be verified with other trades during construction.

F. Prefabricated Equipment: Installation of all prefabricated items and equipment shall conform to the requirements of the manufacturer's specifications and installation instruction pamphlets. Where code requirements affect installation of materials and equipment, the more stringent requirements, code or manufacturer's instructions and/or specifications, shall govern the work.

G. Firestopping:

1. It is the intent of the contract documents, which are presented in “design-build” format for the contractor to design, provide and install a complete and fully functioning, code approved, UL listed fire stop assembly/system(s).

2. The contractor shall be responsible for furnishing all final design, agency approvals, labor, equipment, materials, and performance of operations in connection with the installation of a complete and fully functioning code approved fire stop assembly/system(s).

3. It shall be the contractor’s responsibility to provide all material and equipment, which is usually furnished with such systems, in order to provide a complete and fully functioning code approved firestop assembly/system(s) whether mentioned herein or not.

4. Each fire stop assembly/system shall have an "F" and/or "T" rating as required by each penetration condition. Each Firestop assembly/system shall have a current U.L. listing, as indicated in the latest edition of the U.L. Fire Resistance Directory, and be approved for use by the authority having jurisdiction. The contractor shall install each firestop assembly/system in accordance with the manufacturer's printed instructions.

5. Each fire stop assembly/system shall be labeled with fire stop manufacturer-furnished label on each side of the fire stopping systems depicting UL # etc.

H. Housekeeping Pads

1. Provide a minimum 3" high housekeeping pad above finished floor/finished grade for all exterior floor mounted switchgear, distribution boards, transformers, motor control centers etc flush with the face of the equipment. Provide a minimum 3" high housekeeping pad for all floor mounted switchgear, distribution boards, transformers, motor control centers, transfer switches etc located in mechanical central plant(s) and other mechanical spaces flush with the face of the equipment. Confirm pad dimensions with local inspector prior to forming pad to ensure any local code interpretations/conditions regarding housekeeping pads are met.

2. Unless otherwise noted above, provide a minimum 1-1/2" high housekeeping pad above finished floor/finished grade for all interior floor mounted switchgear, distribution boards, transformers, motor control centers, transfer switches etc flush with the face of the equipment. All housekeeping pad heights are as measured from finished floor or grade. Confirm pad dimensions with local inspector prior to forming pad to ensure any local code interpretations/conditions regarding housekeeping pads are met.

3. Provide a 1-1/2" high housekeeping pad above finished floor/finished for service equipment. Prior to pad rough-in, contractor shall verify serving utility company's maximum meter height requirements and, if necessary, adjust height of housekeeping pad to comply with those requirements. In indoor applications, the pad shall be flush the face of the switchgear. In outdoor applications, the housekeeping pad shall extend a minimum of 4 feet from the front of switchgear's weatherproof enclosure. Confirm pad dimensions with local inspector prior to forming pad to ensure any local code interpretations/conditions regarding housekeeping pads are met.

4. All housekeeping pads located in, on or attached to a building shall be seismically braced/connected to the building structure.

I. Concrete Pullboxes and Manholes

1. Excavate for installation of pre-cast structures remove excess excavated material from the site. Saw cut existing paving and concrete as required for excavation. Where multiple conduits enter sheet steel pull boxes, boxes shall be field punched. Do not use boxes with concentric knockouts.

2. Provide a minimum of 6" deep sand bedding base under each pull box and manhole. Bedding shall be level and well compacted by a

minimum of four passes with a plate type mechanical vibrator.

3. Install a floor drain in every concrete pullbox into a sump containing 10 cubic fee of 1" crushed rock; minimum size 48" deep and 36" diameter. Provide 36" length of tile pipe extending down into the sump. Provide a grille over the top opening of pipe.

4. Back fill and compact each around pre-cast structure after installation of the structure to 95% minimum compaction in horizontal lifts of 8" thickness or as stated by compaction equipment. Replace paving, concrete, landscaping above structure to match existing.

5. Install pre-cast structures per manufacturers recommendations to provide a dry watertight installation. Set cover flush with existing grade or finish surface. Where pre-cast structure is installed in pedestrian walkway or vehicular traffic way with a sloping finish grade, slope cover to match existing.

6. Install structures to avoid surface water drainage flow lines, and existing utilities.

7. Entrances of conduits/ducts shall terminate with end bells inside the pre-cast structure.

8. Where pullboxes/manholes are shown to intercept existing conduit, remove portion of existing conduit approximately 4 ft. back from wall, re-grade and excavate conduit entrance and extend existing conduit into pullbox. Pot hole as required to locate conduit(s).

9. Provide 10' long x 3/4" diameter copper clad, steel, driven ground rods through the floor of the pre-cast structure. Ground rod shall extend 6" above the floor line. Where rock bottom is encountered, bury ground rod in horizontal trench with projection into pre-cast structure. Seal off openings around ground rod.

10. Ground permanently and effectively together all metal equipment cases, cable racks, etc., with #4 bare copper bonding conductor. Provide UL compression bonding fittings at each ground connection.

11. After cable shave been pulled and inspected, seal box between cover and frame with a mastic compound similar to Parmagum or Dukseal.

12. Exterior concrete walls, tops and bases of pre-cast structure shall be damp-proofed with two coats of a bituminous damp-proofing material, minimum finish thickness 4-mil.

13. Connections to Pre-cast Structure.

a. Lines connecting to pre-cast structures shall be constructed to have a cast in place concrete tapered section adjacent to the structure and extending a minimum of 48" out from the structure to provide shear strength.
b. Pre-cast structure shall be constructed to provide for keying the concrete envelope of the conduit/duct line into the wall of the structure. Mechanical vibrators shall be used when this portion of the envelope is poured to assure a seal between the envelope and the wall of the pre-cast structure.
c. Provide end bells in duct entrances. Terminate each metal conduit with insulated bushing having grounding terminal, O.Z. Type "Big".

14. Place pulling irons on opposite walls and below horizontal centerlines of ducts and bricked-up openings, and in bottom. Install pulling irons with each end hooked around a reinforcing bar.

15. Identify all power and signal cables by tagging in all manholes and pull boxes. Tie securely to cables with nylon cord or insulated type TW wire. Tie so that turns of wires do not form a closed electrical circuit.

16. Manholes, vaults and pullboxes required by utility company, and installed by Electrical Contractor, shall meet all requirements of utility company.

J. Trenching, Footings, Sleeves

1. Provide trenching, concrete encasement of conduits, backfilling, and compaction for the underground electrical work, in accordance with applicable sections of this specification. Back fill and compact earth after installation of duct bank/apparatus to 95% minimum compaction in horizontal lifts of 8" thickness or as stated by compaction equipment. Replace paving, concrete, landscaping to match existing as applicable.

2. Provide footings for all post and/or pole mounted lighting fixtures: Concrete shall conform to the applicable sections of this specification.

3. Sleeves:

a. Provide sleeves for raceways, conduit and pathway for future cabling passing through the following construction elements.
1) Concrete foundations, floors, walls and slabs.
2) Lath and plaster walls and ceilings.
3) Building structures (i.e. foundations, walls, floors, ceilings, and roofs) with a fire rating exceeding 20 minutes.
4) Full height interior walls.

b. Provide sleeves through inaccessible ceiling areas to create a cabling path to the main signal/data room(s) to allow for the installation of future cabling.

c. Sleeves shall be flush with walls and foundations. Sleeves shall be installed at exact penetration locations and angles to accommodate raceway and conduit routings.

d. Joists, girders, beams, columns or reinforcing steel shall not be cut or weakened. Where construction necessitates the routing of conduit or raceways through structural members, framing or under footings, written permission to make such installation shall first be obtained from the Architect. Such permission will not be granted, however, if any other method of installation is possible.

e. The layout and design of raceways and conduits located in or routed through masonry or reinforced beams or walls shall be reviewed by the Architect before any work is performed. All sleeving shall be accomplished according to the instructions of the Architect and shall be accepted before any concrete is poured.

f. Sleeves, raceways and conduit shall be located to clear steel reinforcing bars in beams. Reinforcing bars in walls shall be offset to clear piping and sleeves.

g. Provide ½" continuous clearance between inside of sleeve and exterior of conduits and raceways passing through the sleeve, unless otherwise specified. Where sleeves pass through outside walls below grade, provide full 1" clearance between exterior of conduits and raceways passing through the sleeve. For seismic joints, clearance shall be 3".

h. Sleeves set in fire rated walls, or floors shall be sealed. Sleeving shall maintain the fire rating of the wall or floor. A UL listed fireseal / fire barrier / firestop system shall be installed in accordance with the manufacturer's requirements. Provide sleeves, wrapping, caulk and supports.

i. Sleeve Material:
   1) In concrete walls and footings: Schedule 40 black steel pipe. When installed in outside walls, seal outer surface watertight.
   2) In lath and plaster partitions and ceilings: 24 gauge galvanized iron or steel.

K. Concrete Work

1. Concrete work stall be executed in accordance with all applicable codes and regulations of the California Code of Regulations, Title 24, Part 2, Chapter 19A.

2. Form:

    a. Space forms properly with spreaders and securely tie together. Do not use twisted wire form ties. Keep forms wet to prevent joints from opening up before concrete is placed. Replace improper construction as directed. Do not use wood inside forms.

    b. Build in and set all anchors, dowels, bolts, sleeves, iron frames, expansion joints and other materials required for the Electrical Work. Place all items carefully, true, straight, plumb and even.

    c. Carefully remove all exposed forms. Cut nails and tie wires below face of concrete and fill all holes. Rubbish will not be allowed to remain in, under, or around concrete.

3. Mixing: Use batch machine mixer of approved type. After ingredients are in mixer, mix for at least 1-1/2 minutes.

4. Transit mixing: In lieu of mixing at site, transit mixing may be used if rate of delivery, haul time, mixing time, and hopper capacity is such that concrete delivered will be placed in forms within 90 minutes from time of introduction of cement and water mixer.

5. Placing of Concrete:

    a. Before placing concrete, remove wood, rubbish, vegetable matter and loose material from inside forms. Thoroughly wet down wood forms to close joints.

    b. Clean reinforcement; remove paint, loose rust, scale and foreign material. Bars with bends not called for will be rejected. Hold securely in place to prevent displacement. Lap bar splices 30 diameters, min; lap fabric one mesh min. tie intersections, corners, splices with 16 ga. Annealed wire, or as otherwise called for.

    c. Place concrete immediately after mixing. Do not use concrete that has begun to set; no tempering will be allowed. If chuting issued, avoid segregation. In placing new concrete against existing concrete, use bonding agent per manufacturer's directions.

    d. Give careful and thorough attention to curing of concrete. Keep concrete and forms wet for a minimum of 10 days, after placing concrete.

6. Concrete Finish:

a. Finish of Exposed Concrete: Horizontal surfaces, steel troweled monolithic finish; vertical surfaces, smooth and free of fins, holes, projection, etc.

b. Exposed lighting pole bases shall be finished to a smooth finish. Provide sandblast finish to create texture and eliminate swirl lines from forms.

L. Sound Control

1. Before the work will be accepted as complete, quietness of operation, to a degree satisfactory to the Architect, shall be attained for apparatus, equipment, fixtures, etc., included under the electrical work. Provide isolation and vibration protection required.

2. It is the objective of this specification to provide the necessary design for the avoidance of excessive noise or vibration in the building due to the operation of machinery or transformers, and/or due to interconnected conduit.

a. Furnish and install the vibration isolation devices as specified herein.

b. Do not install any equipment or conduit as specified in the schedule, which makes rigid contact with the "building" unless it is approved in this specification or by the Architect. "Building" includes slabs, beams, studs, walls, lath, etc.

c. Coordinate work with other trades to avoid rigid contact between equipment or conduit as specified in the schedule and the building. Inform other trades following his work, such as plastering, to avoid any contact, which would reduce the vibration isolation.

d. Bring to the Architect's attention, prior to installation, any conflicts with other trades which will result in unavoidable contact to the equipment or conduit as specified in the schedule, described herein due to adequate space, etc. Corrective work necessitated by conflicts after installation shall be at the Contractor's expense.

e. Obtain written and/or oral instructions from the vibration isolation manufacturer as to the proper installation and adjustment of vibration isolation devices.

g. Correct, at no additional cost, all installation, which are deemed to be defective workmanship or materials by the Architect.

3. Isolators shall be provided at transformers and electrical equipments where indicated on the drawings. Isolators shall be OSA approved and manufactured by California Dynamics Corporation RJEQ Series or Sausse RMLS Series or Mason Industries BR Captive Mounting Series.

4. Provide flexible conduit or an approved vibration isolation device between any transformer, and building structure and/or between any transformer and equipment mounted directly to building structure.

5. Electrical panels shall be connected to transformers by flexible conduit. Do not contact stud or masonry partitions. Isolate panels from the floor as specified herein.

6. Provide flexible conduit connections at all air conditioning, plumbing, etc., or any rotating or oscillating equipment requiring electrical motors. Base the length of flexible conduit required for each motor upon the requirements for a 360° loop in the conduit between the electrical motor and electrical box. (Do not actually twist the conduit into a loop).

7. As an alternative, a neoprene or rubber busing between the conduit and the electric motor to break the metal-to-metal contact may be used. Provide a flexible ground strap to complete the electrical ground.

END OF SECTION 26 10 00

SECTION 27 10 00

STRUCTURED CABLING SYSTEM

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. The work under this section includes all final design, material, equipment, supplies, labor, testing, and accessories required to furnish and install a complete Structured Cabling System (SCS) as indicated on the drawings and as specified herein. These systems shall be defined as all cables, equipment, products, and etcetera, as indicated on the drawings and mentioned in these specifications.

B. It is the intent of the Drawings and Specifications, which are presented in a "design-build" format, for the Contractor to design, provide and install a complete, fully operational, and tested system.

C. All miscellaneous system components including, but not limited to, cables, cable supports, termination equipment, punch blocks, patch panels, patch cords, device outlets, ladder runway, backboards, equipment racks, equipment cabinets, enclosures, terminal cabinets, equipment grounding, and any other related items shall be furnished and installed complete under this section, such that the system shall perform all functions listed herein in compliance with all of the specified requirements.

D. Schedule is paramount to the project's success. With this, the Contractor will have to be a team player, continually working with the team to facilitate expeditious design, procurement, and construction processes.

E. This project will be performed in a phased construction format. Each phase of construction will be completely installed, labeled, and tested, to the greatest extent physically possible, before moving to the next phase.

F. Romoland School District requires a Berk-Tek/Leviton structured cabling system. The cabling system(s) shall be backed by a minimum 25-year factory system performance warranty between the Romoland School District and the cabling manufacturer. All companies bidding, submitting proposals, or engaged in any way, must provide a certificate of authorization to facilitate the warranty with all responses to Requests for Proposals, Requests for Quotation, or any other pricing method. The authorization must be in force a minimum of one (1) year prior to the beginning of any work. No site certifications shall be accepted. The companies shall provide a list of references, five (5) minimum, of work for other school districts encompassing a similar scope in which the approved system was approved for factory warranty.

G. It is a mandatory requirement that a single Contractor perform the work described in the following specification sections:

1. Section 27 10 00 Structured Cabling System

1.2 RELATED WORK, STANDARDS, DOCUMENTS AND PUBLICATIONS

A. Each agency's relative codes, standards, and recommended practices apply to the voice/data cabling systems and their components as specified herein:

1. American National Standards Institute (ANSI)

    a. ANSI T1.404 Network and customer installation interfaces – DS3 and metallic interface specification

2. Building Industry Consulting Service International (BICSI)

    a. Telecommunications Distribution Methods Manual (TDMM) – latest edition.
    b. Customer-Owned Outside Plant Design Manual (CO-OSP) – latest edition.

3. Federal Communications Commission (FCC)

    a. FCC Part 68 Rule

4. American Society for Testing and Materials (ASTM)

    a. E814-02 Standard Test Method for Fire Tests of Through-Penetration Fire Stops

5. International Electrotechnical Commission (IEC)

    a. IEC 61935-01 Generic Cabling Systems - Specification for the testing of balanced communication cabling in accordance with ISO/IEC 11801 Part 1: Installed Cabling
    b. IEC 61935-02 Generic Cabling Systems - Specification for the testing of balanced communication cabling in accordance with ISO/IEC 11801 Part 2: Patch Cords and Work Area Cords

6. Institute of Electrical and Electronics Engineers (IEEE)

    a. IEEE 802 Specification for Local Area Networks, latest edition.
    b. IEEE 802.3an Specification for 10GBASE-T Ethernet, latest edition.
    c. ANSI/IEEE C62.41 – Guide on the Surge Environment in Low-Voltage (1000V or less) AC Power Circuits, latest edition.

7. International Organization for Standardization (ISO)

    a. ISO/IEC 11801 Information Technology – Generic Cabling for Customer Premises, latest edition.
    b. ISO TR 24750 Technical Report

8. National Fire Protection Association (NFPA)

    a. ANSI/NFPA-70 National Electric Code – Current version as adopted by AHJ(NEC), California Electric Code.
    b. ANSI/NFPA-75 Standard for the protection of information technology equipment

9. National Electrical Manufacturers Association (NEMA)

10. Occupational Safety and Health Administration (OSHA)

11. Telecommunications Industry Association (TIA)

a. Optical Fibers Suitable for Manufacturing OM4 Cabled Optical Fiber.
b. TIA-526-7 Optical Power Loss of Installed Single-Mode Fiber Cable Plant.
c. TIA-526-14-B Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant; IEC 61280-4-1 Edition 2, Fiber-Optic Communications Subsystem Test Procedure- Part 4-1: Installed Cable Plant- Multimode Attenuation Measurement.
d. TIA-568-C.0 Telecommunications Cabling for Customer Premises, latest edition.
e. TIA-568-C.1 Commercial Building Telecommunications Cabling Standard
f. TIA-568-C.2 Twisted-Pair Telecommunications Cabling and Components Standard, latest edition.
g. TIA-568-C.3 Optical Fiber Cabling Components Standard, latest edition.
h. TIA-568-C.4 Broadband Coaxial Cabling and Components Standard
i. TIA-569-C Telecommunications Pathways and Spaces, latest edition.
j. TIA-598-C Optical Fiber Cable Color Coding.
k. TIA-606-B Administration Standard for Commercial Telecommunications Infrastructure, latest edition.
l. TIA-607-B Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications, latest edition.
m. TIA-758-B Customer-Owned Outside Plant Telecommunications Infrastructure Standard, latest edition.
n. TIA-862-A Building Automation Systems Cabling Standard, latest edition.
o. TIA-942-A Telecommunications Infrastructure Standard for Data Centers
p. TIA-1152 Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling, latest edition.

12. Underwriters Laboratories Standards (UL)

a. UL 5 Surface Metal Raceways and Fittings, latest edition.
b. UL 5A Nonmetallic Surface Raceways and Fittings, latest edition.
c. UL 5B Strut-Type Channel Raceways and Fittings, latest edition.
d. UL 5C Surface Raceways and Fittings for Use with Data, Signal, and Control Circuits, latest edition.
e. UL 514A Metallic Outlet Boxes, latest edition.
f. UL 514B Conduit, Tubing, and Cable Fittings, latest edition.
g. UL 514C Nonmetallic Outlet Boxes, Flush-Device Boxes, Covers, latest edition.
h. UL 514D Cover Plates for Flush-Mounted Wiring Devices, latest edition.
i. UL 1685 Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables, latest edition.
j. UL 1863 Communications-Circuit Accessories, latest edition.

13. Intertek Testing Services ETL SEMKO (ETL)

B. The Contractor shall be responsible for obtaining and utilizing the latest Structured Cabling, Architectural, Security and Electrical plans.

1.3 GENERAL REQUIREMENTS

A. Manufacturer: The term “manufacturer” shall be defined as the company, or group of companies, that produces the products meeting the requirements of Section 2 of this document. The manufacturer shall have a minimum of seven (7) years’ experience in manufacturing products of this type and shall be ISO 9001 Certified. The products, summarized in this specification, shall be supplied by a single manufacturer, except for:

1. Data racks and other hardware that is not defined as part of the copper cable channel test configuration by TIA-568-C.

2. Fiber Optic Cable and Outside plant (OSP) fiber optic cable.
3. Channel solutions consisting of cabling and connectivity hardware independently tested as by UL or ETL and that are listed Section 2 of this document.
4. Cables manufactured by another manufacturer specifically called out on the drawings.

B. Contractor: The term “Contractor” shall be defined as the company, or group of companies, that provides the products per Section 2 and installs the products per Section 3 of this document. The Contractor selected to provide the installation of this system shall be certified by the manufacturer in all aspects of design, installation and testing of the products described herein.

1. The Contractor shall hold a valid State of California C-7 Low-Voltage license, shall have completed at least ten (10) projects of equal scope, shall have been in business of furnishing and installing systems of this scope and magnitude for at least the past five (5) consecutive years, and capable of being bonded to assure the Owner’s Project Manager of performance and satisfactory service during the guarantee period.
2. The Contractor shall have a minimum of one (1) Registered Communications Distribution Designer (BICSI RCDD) and a minimum of one (1) BICSI Technician level installer on staff as full-time employees.
3. All work shall be performed under the supervision of a company accredited and trained by the manufacturer and such accreditation must be presented with the bid submittal. Contractor must be accredited a minimum of 180 days prior to bid submittal date.
4. The Contractor shall be a manufacturer’s Authorized Installer and Warranty Station for the equipment offered and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment.
5. All personnel performing work on this project must have successfully completed the manufacturer’s training course prior to performance of any work on this project. Accreditation will consist of individual employee certifications issued by the manufacturer. All personnel engaged in the testing of fiber optic and category-6 metallic premise horizontal and distribution systems must have successfully completed the test equipment manufacturer’s training. Certification of such training must be presented with the bid submittal.
6. The Contractor selected for this Project shall adhere to the engineering, installation and testing procedures and utilize the authorized manufacturer components and distribution channels in provisioning this Project.
7. The Contractor shall own and maintain tools and equipment necessary for successful installation and testing of fiber optic cable, and Categories 6 and 6 metallic premise horizontal and distribution systems and have personnel who are manufacturer- trained in the use of such testing tools and equipment.
8. The Contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction (AHJ) over the work.
9. The Contractor shall maintain and provide appropriate liability and worker’s compensation insurance coverage.
10. For additional Contractor requirements, see Section 1.06 of this document in its entirety.

1.4 QUALITY ASSURANCE

A. It is the intent of these specifications to establish an installation standard of quality for labor and materials. For any proposed product substitution, or when the Contractor intends to include a “Substitution/or-equal” product in the bid pricing, the Contractor shall provide a “Substitution/Or-Equal Request” submittal to the Owner’s Project Manager for review no later than ten (10) calendar days prior to Bid submittal. This report shall include *all* of the following items:

1. Description of how the proposed product(s) will impact meeting the project completion date, indicate all item(s) with lead times and expected delivery date(s).
2. Itemized cost comparisons between the proposed product(s) and the listed product(s).

3. Detailed technical analysis of the electrical and mechanical specification differences between the proposed product(s) and the listed product(s).
4. Provide either ETL “Verified” or UL “Verified” test lab documentation for the proposed product(s) and assemblies proposed.
5. Proposed product identification, manufacturer literature (specifications and cut sheets).
6. Name, address, and contact information of several (minimum of two) similar projects where the substituted product(s) have been used.
7. Name, address, and contact information of the proposed product(s) manufacturer’s local representative.
8. Sample proposed product(s) manufacturer’s component and application extended warranty. Detailed warranty requirements are described in Section 1.10 General System Product Warranty of this document.

B. Failure to provide *all* items listed in Section 1.4.A.1 through 8 for review by the Owner’s Design Team shall result in rejection of the substitution/or-equal request.

C. The Contractor’s bid shall include pricing for all specified products called out in the bid documents. The Contractor’s bid shall also include alternate pricing for the proposed Substitution/Or-Equal products.

D. The Owner’s Design Team/Project Manager must approve any proposed product(s) substitution/or-equal item in writing. The Owner’s Design Team/Project Manager reserves the right to require a complete sample of any proposed product(s) and may request a sample tested by an independent testing consultant to prove equality. The decision of the Owner’s Design Team/Project Manager regarding equality of proposed product(s) items will be final.

E. If a proposed product(s) is given final acceptance by the Owner’s Project Manager, the Contractor shall reimburse the Owner’s Design Team/Project Manager for the costs to review the proposed product(s) substitution(s), and for any additional engineering charges, and shall pay all charges of other trades resulting from this products use, at no cost to the Owner.

1.5 GENERAL SUBMITTAL REQUIREMENT

A. Submittals shall be presented and formatted per the guidelines in the Division 1 section of this bid package.

B. All cut sheets shall represent the latest version, part number, and revision of the product. Where multiple products or part numbers appear on a page, a bold arrow or circle shall indicate which product or part numbers are to be used as part of the installation. The submittal shall include all descriptive pages associated with the product, not just the page showing the part number. Contractor submittal shall include a materials list. Cut sheets shall be numbered by and match page numbers of each item included on the material list.

1.6 PRE-INSTALLATION SUBMITTAL REQUIREMENTS

A. Within fifteen (15) calendar days after the date of award of the Contract, the Contractor shall submit the following:

1. Submittal Binder: Submit one (1) hard copy and one (1) electronic copy of the complete Submittal Binder to the Project Engineer for review. The binder shall consist of five (5) major sections with each section separated by Index Tabs. Each page in the binder shall be numbered sequentially and shall be summarized in the Index.

a. The FIRST section shall include the following items:

1) The TITLE SHEET which shall include the Submittal Date, Project Title and Address, Contractor's Name and contact information, and name of the Owner.
2) The INDEX sheet which shall list each item included in the binder along with the page number where it may be found.

b. The SECOND section shall include the following items:

1) CONTRACTOR'S LICENSE: A copy of the low voltage Contractor's valid State of California C-7 Low-Voltage license.
2) PROOF OF EXPERIENCE: Proof (written documentation) that the low voltage Contractor has been regularly engaged in the business of low voltage contracting consisting of, but not limited to, engineering, fabrication, installation, and servicing of communication systems of the type specified herein for at least the past five (5) consecutive years.
3) PENDING LITIGATION: Provide a statement summarizing any pending litigation involving any officer or principal of/or the company, the nature of the litigation and what effect the litigation may carry as it relates to this work in the worst-case scenario. Non-disclosure of this item, if later discovered, may result, at the Owner's discretion, in the Contractor bearing all costs and any cost related to the associated delays in the progress of the work.
4) INSURANCE CERTIFICATES: Copy of low voltage Contractor's current liability insurance, workers compensation, and state industrial insurance certificates in conformance with the contract documents.
5) PROJECT LIST: A List containing at least ten (10) California installations completed within the last five (5) years by the low voltage Contractor that are comparable in scope and nature to that specified in the contract document. Provide up to date contact information for each project listed including contact name, title, email address and phone number.
6) SERVICE CAPABILITY: Documentation indicating in detail that the low voltage Contractor has competent engineering, installation, service personnel and facilities with reasonable stock of service parts within 75 air miles of the job site. Do not submit a sales brochure as documentation.
7) AUTHORIZATION LETTERS: Letters from the low voltage equipment manufacturer stating that the low voltage bidding Contractor is a Factory Authorized Distributor/Installer and is trained and certified for the equipment he proposes to use on this project, and is licensed to purchase and install software required to provide the specified functions.
8) CERTIFICATION: Copy of the following current BICSI certifications. Provide proof that the certificate holders are full time employees of the low voltage Contractor's local facility servicing this project and will be actively involved on site for the duration of this project.

    a) BICSI RCDD, minimum of (1). Mandatory requirement: Shall be on site a minimum of one (1) day per workweek.
    b) BICSI TECHNICIAN, minimum of (1). Mandatory requirement: Shall be on site a minimum of five (5) full 8-hour days per workweek.

9) PROOF OF TRAINED PERSONNEL: Documentation that the Contractor has full time on-staff personnel, manufacturer trained and BICSI certified, for the equipment proposed for this project, and on-staff manufacturer trained and certified by the Test Equipment manufacturer in the proper use of the test equipment required on this project. Provide copies of all manufacturers' training/certification documentation, and Test Equipment manufacturer's training/certification documentation. Provide a statement that personnel

meeting these qualifications are in the local facility and will be maintained at that facility throughout the project and the warranty period.

10) DOJ FINGERPRINTING: A fingerprint check must be provided for all personnel working on school sites, performed by the Department of Justice, pursuant to California Education Code Section 45125.1. Fingerprinting shall be performed prior to start of project. All costs associated with DOJ fingerprinting/background checks shall be the full responsibility of the Contractor.

c. The THIRD section shall contain a detailed bill of materials including the quantity, product Manufacturer, product part number, product description, and corresponding specification section number or drawing sheet number where that product is referenced. Also listed in the Contractor's bill of materials shall be each item of test equipment to be used to test the optical fiber, copper, and coax components. Include all patch cords and other specialized components. See example format below:

Description	Part #	Quantity	UoM	Spec	Test Equip.
CAT6 Station cable	Berk-Tek 10136339 (Blue)	100 boxes	1000ft/box	2.03	Fluke DTX-1800
CAT6A Station cable	Berk-Tek 11140404 (Green)	100 boxes	1000ft/box	2.03	Fluke DTX-1800

This information may be used by the Owner to evaluate the Contractor's general understanding of the project scope during the bid evaluation. Errors or omissions from this bill of material do not relieve the Contractor from providing all material, components, labor, and etcetera, as outlined in this specification and on the drawings to provide a complete and useable structured cabling system.

d. The FOURTH section shall contain original manufacturer cut sheets for all of the materials that meet the requirements listed in Section 2 of this specification and all materials described on the construction drawings. Also include manufacturer's cut sheets for all testing equipment to be used for completion of the project. All pages shall be numbered sequentially corresponding to the bill of materials. On each cut-sheet, provide an indicating arrow next to each part number of proposed material.

e. The FIFTH section shall contain a designation schedule for each system component location and complete full size 30" x 42" (unless otherwise specified) bond drawings (shop drawings), showing system wiring plans. The professionally drafted drawings shall be generated on AutoDesk AutoCAD 2010 (or later) computer design software. These drawings shall also include:

1) MDF and IDF Diagrams - Including:

   a) Cable routing
   b) Position of all devices, components, and apparatus
   c) Detailed elevation layout of the wall field(s)
   d) Labeling plan (see District labeling requirements)

2) Site Plan – Including:

   a) Conduit routing of all site conduits including size and quantity

b) Building designations
c) MDF and IDF locations
d) Campus cabling and conduit between MDF and IDF racks including cable type and quantity

3) Work Area Floor Plans - Including:

a) Detailed cable routes including cable type and quantity
b) Device locations and quantities with labeling
c) Work area labeling plan (see District labeling requirements)

4) Cross Connect Documentation - Including:

a) Cross-connect records for all voice and data devices

b) Cross-connect records may be in either Excel or Word format

5) Riser Distribution Plan
6) Rack elevations of all MDF and IDF equipment
7) 1/4-inch scale floor plans of all data rooms (MDF, IDF, MPOE, etc.)

a) Identify all equipment racks, cabinets, terminals, cross connect locations, ground bus bar, and all other components in room(s).

8) Cable Tray, Conduit, and Raceway Plans (if applicable)

a) Provide 1/4-inch scale ladder runway plan for all data rooms.
b) Provide scaled plans for all in-building conduit and raceway.

B. Failure to comply with any of the requirements listed above may result in the rejection of the entire submittal package.

1.7 PROJECT DIRECTION

A. Single Point of Contact: Contractor shall provide an English-proficient, single point of contact, i.e., Project Manager, to speak for the Contractor and shall provide the following functions:

1. Initiate and coordinate tasks with Owner's Project Manager, and others as specified by Owner's Project Manager.
2. Provide day-to-day direction and on-site supervision of Contractor personnel.
3. Shall be readily available to the Owner/Owner's Project Manager 24 hours a day / 7 days a week throughout the duration of the Project.
4. Shall have full time cellular phone capability, and the ability to send/receive email correspondence, accessible by the Owner's Project Manager.
5. Ensure conformance with all Contract provisions.
6. Participate in weekly site project meetings and construction meetings.
7. Provide detailed and written weekly status reports to Owner's Project Manager. The content shall be substantive enough to bring about a full understanding of all situations current and situations future. Weekly reports shall include but are not limited to detailed progress report, RFI status log (Request for Information), Change Order Log (pending and approved), Project Addendum log, and a two-week look ahead work calendar. Each of the above must show assigned responsibilities and event history. Weekly reports shall include milestone information, resource updates (staff and materials), and any conditions or incidents that may impact the Project Schedule.

8. This individual shall remain as Project Manager for the duration of the project. The Contractor may change Project Managers only with the Owner's Project Manager's written approval.

1.8 PLANNING

A. Planning meetings and schedule: Within fifteen (15) calendar days after the date of award of the Contract, an initial planning meeting will be held with the successful bidder to clarify all requirements (systems, services, distribution methods, etc.), identify responsibilities, and schedule the events that will transpire during the implementation of the project. Within seven (7) calendar days of this initial meeting, the Contractor shall provide a written report and project schedule to clearly document the events and responsibilities associated with the project. Contractor's project schedule shall conform to the overall Project Construction Schedule issued by the Construction Management Company or the Owner. Contractor is required to attend all planning and other construction meetings as requested by the Owner, Architect, or Engineer of Record.

1.9 POST INSTALLATION SUBMITTAL REQUIREMENTS

A. Within fifteen (15) calendar days after the completion of work, the Contractor shall submit the following:

1. Record Documentation:

a. Final Test Results – Test results for each cable indicating tests performed, results obtained, and values measured. Test results shall be provided in electronic format with the associated application (if required) for viewing. Contractor shall provide individual test results for each cable tested, and a summary sheet listing all cables, test summary, lengths, and the total cable count. Provide test reports for all copper cables and fiber optic cables. Testing shall be conducted in accordance with Section 3.06 of this document.
b. As-Built records – Contractor shall create and provide all backgrounds and floor plans in AutoCAD or Revit file format. Sheet boarders shall be either provided by, or approved by, the Architect. Contractor's as-built records shall include all of the items described and listed in section 1.6.A.1.e of this document.

B. After as-built submittal is approved by Owner, the Contractor shall provide two (2) sets of CDs containing all post-installation submittals and close out documentation in AutoCAD (or Revit) format; and in PDF, Word, or Excel formats as required elsewhere in this document.

C. As-Built Documentation Display in Each MDF and IDF: Within fifteen (15) days after the completion of work, the Contractor shall install a complete Contractor-provided, professionally drafted as-built floor plan in color in each MDF and IDF mounting frame. Each floor plan, generated on AutoDesk AutoCAD computer design software and printed in color, shall depict all jack locations in each modular furniture cubicle and all other areas. Also depicted shall be speaker, clock, wireless access point, terminal cabinets, MDF, IDF, pull boxes, vaults, CCTV cameras, television jack locations, or any other communications outlet cables by the Contractor. All jack locations shall be color coordinated with the Owner's labeling scheme as described elsewhere in this specification. Contractor's device symbols shall match the device symbols utilized on the bid documents. The Contractor will provide to Owner two (2) sets of CDs containing all as-built records in AutoCAD (.dwg) or Revit (.rvt) format, and full-size PDF format.

D. Warranty Documentation

1. Contractor shall apply for all Manufacturers' Extended Warranties on behalf of the Owner. Contractor shall present to Owner all product Warranty documents per General System Product Warranty Section of this document. Warranty shall commence after final acceptance of System and Project Close Out by the Owner.

1.10 GENERAL SYSTEM PRODUCT WARRANTY

A. The horizontal communications cabling system installed shall be eligible for coverage by a Limited Lifetime Warranty to the District.

1. Horizontal channels shall be completed with Leviton Network Solutions factory-terminated copper and/or fiber optic patch cords in order to be eligible for the applicable Berk-Tek or Leviton Warranty with Channel Performance guarantees.
2. Approved product shall be listed on the most recent version of the applicable Berk-Tek Leviton Technologies data sheets for each Berk-Tek Leviton Technologies solution.

B. Optimized Installer/Optimized Integrator shall provide labor, materials, and documentation in accordance with Berk-Tek and Leviton Network Solutions requirements necessary to ensure that the Owner will be furnished with a Limited Lifetime Warranty.

C. The installed structured cabling system shall provide a warranty guaranteeing installed channel performance above the ANSI/TIA 568-C requirements for Category 6 cabling systems or ISO 11801 requirements for Class D, Class E, and/or Class Ea. Standards-compliant channel performance tests shall be performed in the field with a Berk-Tek Leviton Technologies approved certification tester in the appropriate channel test configuration. See 1.10. A.1 above for channel requirements.

D. Necessary documentation for warranty registration shall be provided to the manufacturer by the Contractor (within 10 days) following 100 percent testing of cables. Contractor shall submit test results to Leviton Network Solutions or to BerkTek, in the certification test analyzer's original software files. Contractor shall ensure that the warranty registration is properly submitted, with all required documentation within ten (10) days of project completion. Contractor must adhere to the terms and conditions of the respective manufacturer's warranty programs.

E. Installer shall ensure that the Owner receives the manufacturer issued project warranty certificate within sixty (60) calendar days of warranty registration.

F. The first usage date shall be agreed to be in writing by the District and Contractor within five (5) working days of first usage. During this time, the entire system must be kept in proper operating condition at no additional cost to the District.

G. Cable Manufacturer "site certifications" are prohibited.

1.11 GENERAL ENGINEERING AND DESIGN GUIDELINES

A. Cabling System Installation Practices

1. Plastic cable tie (tie wrap) devices shall *not* be utilized at any time. Only Velcro-type hook-and-loop strap devices are permitted. In the MDF and IDF rooms, all vertically run cables and conductors shall be secured with Velcro at a maximum interval of eighteen (18) inches, and all horizontally run cables and conductors shall be secured with Velcro at a maximum interval of eighteen (18) inches.
2. In the MDF and IDF rooms, all vertically run innerduct shall be secured with Velcro at a maximum interval of eighteen (18) inch intervals. Innerduct installed on ladder runway

shall be supported horizontally and vertically at a maximum of eighteen (18) inch intervals.

3. All horizontally run innerduct shall be secured with Velcro at a maximum interval of forty-eight (48) inches when installed horizontal above accessible ceiling spaces or open ceiling spaces.
4. All cables installed above accessible ceiling spaces shall be independently supported
5. All pull ropes are to be installed and/or replaced in all pathways for future use.
6. All intra-building cabling shall be routed either parallel or at right angles to the building structure and/or walls.
7. No cabling is to be pulled through electrical conduit bodies (Condulets) devices. If conduit body devices are pre- existing and it is determined, at the review of the Owner's representative, that sufficient space in the conduit is available and the Owner provides written approval to utilize the Condulet, the Contractor shall remove the Condulet cap, pull the cable to and beyond the cap then carefully reinstall the cap.
8. Communications cabling shall never be tied or attached to the exterior of electrical conduits, power cables or devices, lighting systems, or co-exist inside any pathway with power cabling.
9. Any visible damage to a cable such as kinks or bends in violation of the minimum bend radius shall render the cable segment defective and shall be removed and replaced by the Contractor at no additional cost to the Owner.
10. All materials shall be new, unused, and delivered to job site in original manufacturer or distributor cartons or packages. No previously installed material shall be used at any time.
11. Reference Part 3 of this document for additional installation guidelines and requirements.

PART 2 – PRODUCTS

2.1 STRUCTURED CABLING SYSTEM

A. Acceptable Manufacturers - all equipment listed herein will be by:

1. SCS components: Leviton, BerkTek
2. Cabinets, Racks, Ladder tray: CPI
3. Riser and Outside Plant (OSP) Fiber Optic Cable: BerkTek
4. Protectors: Circa, Emerson or Marconi.

B. It is the responsibility of the bidder to ensure that the proposed product meets or exceeds every standard set forth in these specifications and the equipment's technical data sheets.

C. The functions and features specified are vital to the operation of this facility; therefore, inclusion of a component's manufacturer in the list of acceptable manufacturers does not release the Contractor from strict compliance with the requirements of this specification.

2.2 OUTLETS

A. Telecommunications outlets (TO) shall consist of one- or two-gang utility outlet boxes equipped with 8-pin modular (RJ-45) jacks utilizing the T568B wiring scheme and a faceplate. All outlet cabling shall terminate on patch panels at their associated Main Distribution Frame (MDF) room, Intermediate Distribution Frame (IDF) Rooms, or as otherwise indicated on the drawings.

B. Faceplates

1. All Faceplates shall be available in duplex, quad, or six-plex configuration in a single-gang form.

2. Surface mount boxes shall be available in dual, quad, and six-plex configuration.
3. Modular furniture faceplates shall be available in dual and quad configuration for the Owner's modular existing and/or new modular furniture. Faceplates shall be flush-mounted in the modular furniture. Surface mounted boxes/faceplates are unacceptable. The Contractor is responsible for coordinating with the Owner's modular furniture Contractor to determine faceplate requirements. The Contractor shall provide and install all parts/fittings necessary to meet the requirements of this section.
4. Wall mounted phone jack faceplates shall be single gang configuration, constructed of stainless steel and have two standard phone mounting posts located above and below the jack opening. Wall mounted phone faceplates will consist of 8p8c modular (RJ-45) jacks.
5. Faceplates shall have two (2) designation windows, one located at top and one located at bottom. Designation windows shall be equipped with clear plastic covers to house machine-generated labels.
6. Color of faceplates shall be White, unless otherwise noted.
7. Provide blank faceplate inserts for all unused outlet locations within the faceplate.
8. Product Specification: Leviton 1-port faceplate #42080-1WS, 2-port faceplate #42080-2WS, 4-port faceplate #42080-4WL, 6-port faceplate #42080-6WS.

C. Category 6/6A 10-Gigabit jacks

1. All category 6 jacks shall be 8-position/8-conductor (8p8c) modular RJ-45 jacks incorporating 110-style rear termination lugs for termination of Category 6 cable, T568B wiring type, with a connector body made of high-impact fire-retardant plastic.
2. Category-6 jacks shall be channel-rated.
3. All Category 6 jacks shall meet or exceed TIA-568-C.2 component Cat 6 requirements for connecting hardware from 1MHz to 250MHz.
4. Category 6 jacks shall include a pair separation tower to facilitate required conductor separation.
5. Category 6 jack color shall be Blue.
6. Category 6A jack color shall be Green.
7. Category 6A jacks shall only be terminated on Category 6A cables.
8. Category 6 jacks shall only be terminated on Category 6 cables.
9. Product Specification: Leviton Extreme Cat 6 quick port connector, #6110G-RL6 (Blue).
10. Product Specification: Leviton Extreme Cat 6A quick port connector, #6110G-RV6 (Green).

2.3 STATION CABLE

A. Station cables shall extend between the station location (TO) and its associated MDF/IDF.

B. Category 6 (6) station cable

1. The Category 6 (6) cable shall consist of 4-pair, 23-AWG bare copper twisted pairs with a UTP design.
2. The cable jacket shall be rated for the environment in which it is installed. Install CMP cable in plenum-rated spaces, CMR cable in riser-rated spaces, and OSP cable in outdoor and underground conduit spaces.
3. Category 6 cable shall be ETL verified to TIA-568-C.2-10 Category 6, and support 10GBASE-T IEEE 802.3an standard of up to 250MHz.
4. Color of cable shall be Blue.
5. Category 6 cable shall only be terminated on Category 6-rated jacks and patch panels.
6. Product Specification: BerkTek Cat 6 #10136226 (CMP).
7. Product Specification: BerkTek Cat 6A #11140404 (CMP).

2.4 MODULAR PATCH PANEL SYSTEM – CATEGORY 6

A. The termination block shall support the appropriate emerging high-bandwidth applications, including 1 Gbps Ethernet, potentially 1.2 Gbps ATM and 2.4 Gbps ATM, Multi-Tasked Split Screen Computing, Virtual Holographic Video Conferencing, Instant Access Telemedicine, 3D CAD/CAM Engineering, and Internet-Intranet Communications/ Commerce, as well as all 77 channels (250 MHz) of analog broad band video, including 1000 Mbps Ethernet and potentially 1.2 Gbps ATM, and facilitate cross connection and inter connection using modular patch cords.

B. All Modular jack panels shall be wired to ANSI/TIA/EIA 568-C using T568B wiring scheme.

C. The wiring block shall be able to accommodate 23 AWG cable conductors.

D. The Category 6 modular jack panels shall meet or exceed the Category 6 standards requirements in ISO/IEC 11801 and ANSI/TIA/EIA. They shall also be UL Listed.

E. Contractor shall provide Category 6 modular jack panels in sufficient quantities to terminate all category 6 cables.

F. All patch panels shall have two (2) cable strain relief/management bars (Leviton #49005-CMB) installed at the rear of the panel to support the terminated horizontal cabling.

G. Contractor shall provide and install a 2RU horizontal wire manager immediately below each 2RU patch panel. Contractor shall provide and install a 1RU horizontal wire manager immediately below each 1RU patch panel. A 1RU space shall be left open immediately below the horizontal wire manager before mounting the next patch panel. This space is reserved for installation of a 1RU network switch to service all ports on the patch panel immediately above the horizontal wire manager.

H. Product Specification: Leviton Cat-6 6D460-01L (1ft), 62460-7L (7ft)

I. Product Specification: Leviton Cat-6A H6A10-1G (1ft), H6A10-7G (7ft)

2.5 PATCH / STATION CORDS - CATEGORY 6

A. Provide Category 6 Modular Patch cords and Station cords for each assigned port on the patch panel and for each outlet in the station locations. Cords shall be equipped with an 8-pin 8-conductor modular connector on each end and shall conform to the length(s) specified. All cords shall be wired to T568B wiring scheme. All cords shall be factory-built by the cable manufacturer. Fabrication of cords in the field is prohibited.

B. All Category 6 patch cords shall exceed ANSI/TIA/EIA and ISO/IEC Category 6 specifications.

C. At the MDF and each IDF, provide one (1) 5-foot cat-6 patch cord for each cat-6 cable terminated in the cat-6 patch panels. At the workstations, provide one (1) 10-foot cat-6 patch cord for each cat-6 cable terminated at a cat-6 outlet. In instances where longer cords are required, the Contractor shall clarify the requirement with the Owner before installing any longer cords. Where the specifications and the plan drawings conflict, the more stringent requirement will apply.

D. Contractor shall verify all patch cord color requirements with Owner prior to ordering material. Include all costs in base bid.

E. All patch cords shall meet or exceed the performance criteria of the category 6 cable to which it is connected.

F. Category 6 patch cords shall be provided at all Category 6 patch panels and outlets.

G. Product Specification: Leviton Cat 6, Unshielded, Atlas-X1

2.6 FIBER OPTIC CABLING

A. Fiber optic cable shall meet or exceed ANSI/EIA/TIA-492 specifications and ISO/IEC 11801 standards.

B. All fibers strands shall be color coded to facilitate individual fiber identification.

C. Single mode fiber optic cable

a. Single mode fiber cable shall be OS2, 9-micron, in strand counts as indicated on the plan drawings. Minimum strand count shall be 6 strands.

b. Single mode fiber cable strands shall have dual wavelength capability transmitting at 1310nm and 1550nm ranges.

c. Single mode fiber cable strands maximum attenuation: 0.5 dB/km @ 1310 nm, 0.5dB/km @ 1550 nm.

D. All fiber optic cable installed inside buildings shall be installed within Contractor-provided innerduct. Innerduct shall be rated for the environment in which it is installed. Innerduct shall be orange in color, unless otherwise noted in the bid documents/plan drawings.

E. Outdoor-rated and Indoor-rated cables shall be tight buffered construction.

F. The use of “indoor-outdoor-plenum-rated” cable is acceptable for backbone cable runs between buildings, if it meets the cable specifications listed in section 2.6 of this document.

G. Provide buffer tube fan out kits as required.

H. Product Specification: BerkTek bend-insensitive fiber PDP006AB0707-1/O-C4

2.7 FIBER OPTIC PATCH CORDS

A. Fiber patch Cords shall be available in duplex multi-mode and single mode.

B. Construction shall be either 3.0 mm cordage or 1.6 mm cordage.

C. Connectors shall be available in Duplex SC. Verify with Owner prior to ordering materials.

D. All fiber optic patch cords shall be factory-made.

E. At the MDF and at each IDF room, provide a minimum of two (2) 2-meter SC to SC duplex multi-mode fiber optic patch cords for every 6-strands of multi-mode fiber installed, and two (2) 2-meter SC to SC duplex single mode fiber optic patch cords for every 6-strands of single mode fiber installed. Verify patch cord length and connector types with District in field prior to ordering product.

2.8 FIBER PATCH PANEL / ENCLOSURES

A. Fiber Patch Panels/Enclosures: A rack mount or wall mount enclosure that terminates, provides cross connection, interconnection, and splicing and fiber identification from 18 to 360 fiber strands. The shelf will provide protection from mechanical stress on the cable and fibers and from macro-bending losses.

1. The shelf shall be wall or rack mountable depending on the location requirement. The units must fit into a 19” wide frame arrangement and have an integrated jumper routing trough.
2. When wall mounted, the shelf shall consist of a modular enclosure with front and side access and can be fully administered from the front. Wall mount enclosure shall include adjustable fiber management rings, and be constructed of 16-gauge steel, power coated black.
3. The rack mounted enclosure shall provide front and rear access doors and can be fully administered from the front and rear. The unit shall have integrated sliding tray to allow bulkhead to glide forward or backward after installation.
4. The rack mounted enclosure shall have a transparent hinged front cover to allow visibility of interior after install.
5. Rack mount enclosures shall be available in 1U, 2U and 4U sizes for 19”-wide racks and made of 16-gauge steel power coated.
6. The adapter/connector plates shall snap into the front of the enclosure and accommodate SC connectors as required. Adapter plates shall utilize ceramic sleeves. Multimode adapter plates shall be aqua in color. Single mode adapter plates shall be blue in color.
7. Provide one (1) 6-port SC duplex Aqua colored adapter panel for every 12-strands of multimode fiber optic cable installed.
8. Provide (1) 6-port LC duplex Green colored adapter panel for every 6-strands of single mode fiber optic cable installed.
9. Fiber patch panel/shelf shall be labeled according to the Owner’s specific requirements.
10. Provide quantity of enclosures and adapter panels as required to terminate all strands.
11. Provide blank molded plates to cover all unused panel openings.
12. Include all buffer tube fan out kits as required.
13. Product Specification:

    a. Leviton #49255-H48
    b. Leviton #491RU-HFR
    d. Leviton Adapter plate Single mode green duplex SC #5F100-6VC
    e. Leviton Adapter plate blank #5F100-PLT

2.9 FIBER OPTIC CONNECTORS

A. Fiber Optic Connectors: Provide a field installable single mode and multimode type connectors to terminate fiber optic cables from cable-to-cable, cable-to-equipment or equipment-to-equipment, and to make jumpers.

1. The connector must:

    a. Be pre-polished and field installable.
    b. Have a ceramic zirconia ferrule.
    c. Be capable of mounting on either 250 um or 900 um buffered fiber.
    d. Single mode shall be rated OS2, and multimode shall be rated OM4.
    e. Average connector insertion loss: multimode 0.1dB, single mode 0.2dB. Maximum insertion loss: multimode 0.5dB. Single mode 0.5dB.
    f. Be available in LC style for single-mode and multimode.
    g. Have a locking feature to the coupler and assure non-optical disconnect.

2. Product Specification:

    a. Single mode blue LC, Leviton #49991-SSC

2.10 INDOOR MULTI-PAIR RISER CABLE TERMINATIONS

A. The multipair riser cable wiring block shall be 66M-split-type and support Category 5E and 6 applications and facilitate cross connection and interconnection using either cross connect wire or the appropriate category patch cords. The wiring blocks shall support analog voice circuits (fire alarm, intrusion alarm, elevator phone, etcetera) and building energy management circuits.

1. The wiring blocks shall be fire retardant, molded plastic 4 columns of metal contacts. The blocks will have 100 contacts which are divided into 50 pairs. This will allow the termination of 25 individual cable pairs on the left and right side of the wiring block, for a total of 50 cable pairs per block.
2. The wiring blocks shall have a series of fanning strips shall be located on each side of the block for dressing the cable pairs terminated on the adjacent contacts.
3. Plastic hinged covers shall be provided on each block and shall not interfere with running, tracing or removing jumper wire. Labels shall be color-coded and machine labeled/numbered according to Owner's requirements.
4. The wiring blocks shall be able to mount directly on wall surfaces utilizing a standoff bracket, either with or without metal backboards. The standoff bracket shall be 10" high by 3.40" wide by 1.50" deep.
5. The wiring blocks shall be able to accommodate over 500 repeated insertions without incurring permanent deformation and it shall pass the reliability test of no more than one contact failure in 10,000 connections.
6. Product Specification: Siemon, by Hubbell, 66M-50 with 89B bracket.

B. MPOE/MDF/IDF Rooms, or as otherwise indicated on drawings, shall be equipped with 66M-type termination blocks for termination of analog station cables. All blocks shall be securely fastened to the room backboards or equipment racks – refer to bid documents/plan drawings. Provide all required D-rings or other approved cable guides as required to provide a neat installation. All cables shall terminate in numerical sequence. Refer to subsection above for description of termination blocks.

2.11 PROTECTORS

A. All outside plant underground backbone multi-pair copper cables shall be provided with transient voltage protection between each building with a building entrance-cable protector panel(s). All building-to-building multipair copper cables shall be routed through this protector(s). The protector(s) shall be connected with a #6 AWG copper bonding conductor between the protector's ground lug and the MDF/IDF telecommunications bonding busbar (PBB/SBB).

B. Plug in Surge Protection Modules shall be provided for each pair terminated on the protector chassis. Protector module shall be solid-state type unless otherwise noted.

1. 240VDC/300VDC solid-state protector modules shall provide transient and power fault protection for standard telephone line applications. The modules shall be fast acting, self-resetting current limiters to protect against sneak current type faults. These modules shall be UL Listed with integrated test points and Black in color.
2. 30VDC/75VDC solid-state protector modules shall provide transient and power fault protection for digital and data line applications. The modules shall be fast acting, self-

resetting current limiters to protect against sneak current type faults. These modules shall be UL Listed with integrated test points and Red in color.

3. If protector modules are not called out in the drawings, Contractor shall include all costs in base bid to provide the 75v solid-state modules w/sneak current protection. Confirm module color with Owner's Engineer prior to ordering. In all cases, the Contractor is responsible to coordinate appropriate module with District prior to ordering material.

C. Product Specification: Circa, Emerson or Marconi.

2.12 GROUNDING SYSTEM AND CONDUCTORS

A. The Contractor shall utilize a Telecommunications Bonding Backbone (TBB) as provided by the Electrical Contractor. The Contractor shall terminate TBB cable(s) on Contractor-provided bonding bus bars located at each MDF/IDF Room, or as otherwise indicated on the drawings. Bonding bus bars shall be ANSI-J-STD-607-A compliant, and UL Listed. IDF secondary bonding bus bars (SBB) shall be Chatsworth # 40153-012, or as noted on the drawings. Wall mounted cabinets require a horizontal rack bus bar (CPI) All communication system bonding and grounding shall be in accordance with the ANSI-J-STD-607-E (current edition), the NEC/CEC, and NFPA.

B. Horizontal cables shall be grounded in compliance with ANSI/NFPA 70 and local requirements and practices.

C. Horizontal equipment including cross connect frames, patch panels, cable trays, equipment racks, ladder trays, conduits, active telecommunication equipment, test apparatus and equipment shall be bonded to the bonding bus bars utilizing a #6-AWG solid copper green insulated conductor and 2-hole crimp type grounding lugs. All connections shall be bare metal to bare metal using appropriate antioxidant compound. Burndy mechanical-type grounding lugs and terminals are prohibited. Minimize the length and number of bends of the grounding conductors to the busbar. Attachment to every rack and cabinet shall be made by one of the following methods:

1. Wall mounted IDF cabinets- Attach bonding conductor's 2-hole compression lug to the rear rail's top holes of the rack, or front rail's top hole of the cabinet, using either two (2) tri-lobular thread-forming screws (not self-tapping or sheet metal screws) or by using two (2) standard bolts with two (2) "Type B" internal-external tooth lock washers per bolt. If thread-forming screws are not used, remove paint at the connection point and use an approved anti-oxidant prior to attaching the bonding conductor.

D. The Contractor shall be responsible for providing an approved bonding bus bar at all newly installed distribution frames, and/or insuring proper bonding to any existing facilities. The Contractor shall also be responsible for ensuring ground continuity by properly bonding all appropriate cabling, cable sheaths, circuit protectors, closures, cabinets, service boxes, and framework.

E. Contractor shall label both ends of each bonding conductor as close as practical to the point of termination in a readable position. Bonding tag must indicate the location of both ends of the bonding conductor (e.g. Rack#1 to PBB) and tag must include the warning "If this connector or cable is loose or must be removed, please call the Owner's Telecommunications Manager at xxx-xxx-xxxx".

2.13 EQUIPMENT CABINETS

A. When shown on drawings, cabinets shall be provided by the Contractor to house shelves, patch panels, power strips, LAN electronics, UPS, etcetera. The cabinets shall be made of lightweight aluminum, UL Listed, and include mounting hardware for mounting specified termination equipment to the frame. In addition, the mounting hardware must provide vertical and horizontal wire managers for patch cords and equipment cords.

B. Wall mounted cabinets shall be 30” deep, and available in 24”, 36” and 48” heights.

C. Low Profile cabinets shall be available in 10” deep, and available in 32” and 42” heights.

D. Contractor shall provide horizontal wire managers for patch and equipment cords.

E. Wall mounted cabinets and accessories shall be Black in color unless otherwise noted on the plan drawings.

F. Wall mounted cabinets shall be secured to plywood backboard at locations indicated on the plan drawings. Contractor shall provide and install fasteners and anchors that are designed and rated for the determined mounting surface and building construction type. Contractor shall provide and install fasteners and anchors that are designed and rated for the combined weight of the equipment support cabinet and its contents. Contractor shall be responsible for determining correct cabinet mounting and anchoring methods that will safely support the combined weight of the cabinet and its contents. Contractor shall install cabinet in such a manner that a minimum of four (4) fasteners and/or anchors are attached directly into wall framing studs, or if applicable, masonry or concrete wall. Anchoring methods shall comply with DSA requirements and all local, state, and federal safety codes.

G. Cabinets shall be configured per the District’s Project Manager’s direction.

H. All wall mounted cabinets shall be individually grounded to the nearest electrical panel’s ground busbar using #6 AWG jacketed green conductor. Terminate both ends with a 2-hole compression ground lug. Daisy chaining of ground wire between cabinets or to other components is not allowed.

I. Thirty (30) inch deep cabinets shall come equipped with a locking Plexiglas front door.

J. Product Specification: 4’ CPI CUBE-IT Plus Gen 3 w/ tempered glass door 48”Hx30”D 200lb load rating (White 12419-E48)

2.14 HORIZONTAL AND VERTICAL CABLE MANAGERS

A. Horizontal cable managers shall be available in 1RU and 2RU sizes and fit in 19”-wide racks and cabinets. Horizontal managers shall be single-sided and come equipped with hinged, removable covers.

B. Vertical managers shall be 7-foot high, 6-inch wide, double sided, with full length hinged door on the front and open cable rings on the rear. Provide 10-inch wide instead of 6-inch wide vertical managers when specifically noted on the plan drawings.

C. In each MDF and IDF rack, provide one (1) 1RU horizontal cable manager below each rack mounted fiber enclosure, and below each 24-port patch panel. Provide one (1) 2RU horizontal cable manager below each 48-port patch panel.

D. Product Specification: Chatsworth Vertical Manager #40095-703, Chatsworth 1RU horizontal manager #30139-719, Chatsworth 2RU horizontal manager #30130-719.

2.15 BACKBOARDS

A. Where indicated on plan drawings, provide new plywood terminal backboards. Use Douglas Fir plywood, A/C grade, finished A-side facing out, with prime coat painted on all surfaces (front, back and sides), and a finish coat of white enamel paint on the front. On each plywood sheet leave one (1) Fire Marshal Stamp unpainted for inspection. Unless otherwise indicated, use 8'-0" high x 3/4" thick plywood x length as shown on the plan drawings.

2.16 UNSPECIFIED EQUIPMENT AND MATERIAL

A. Any item of equipment or material not specifically addressed on the drawings or in this document and required to provide a complete and functional SCS installation shall be provided in a level of quality consistent with other specified items.

2.17 FIRE RATED PATHWAY

A. The firewall through-penetration shall be a manufactured, UL Classified, firestop device/ system designed to allow cables to penetrate fire-rated walls with a built-in fire sealing system that automatically adjusts to the amount of cables installed.

B. The firestopping device shall be capable of installation in new construction or retrofit in existing structures.

C. The device shall be UL Tested and Classified in accordance with ASTM E814 (UL 1479) and with ratings up to and including 2 hours.

D. Contractor shall be responsible to provide firestopping devices for all SCS cables that penetrate a fire-rated assembly (wall, floor, ceiling).

E. Manufacturer: Specified Technologies Inc., EZ-Path (#EZDP33FW) or equal by Wiremold.

PART 3 – EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A. The wiring of the system shall be executed in accordance with the drawings and the equipment manufacturer's wiring diagrams. Should any variations in these requirements occur, the Contractor shall notify the District's Project Manager before making any changes. It shall be the responsibility of the manufacturer-authorized distributor of the approved equipment to install the equipment and guarantee the system to operate as per plans and specifications.

B. Furnish all conductors, equipment plugs, terminal strips, etcetera, and labor to install a complete and operable system.

C. The cables within the rack or cabinets shall be numbered for identification using machine generated labels wrapped around the cable jacket within 6 inches of termination point. Refer to Labeling Requirements section of this document for additional requirements. Handwritten labels are prohibited.

D. Splicing of any cable is prohibited.

E. The labor employed by the Contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the District's Project Manager to engage in the installation and service of this system.

F. The system must meet all local and other prevailing codes.

G. All cabling installations shall be performed by qualified and manufacturer-trained technicians.

H. Cable lubricants (i.e. Polywater) shall be used to reduce the cable pull tension stated by the cable manufacturer during cable installation in conduits and innerduct. Contractor shall verify the acceptability of the lubricant to be used with the cable manufacturer, prior to using such a lubricant. Lubricants that harden after installation are not allowed. Submit all proposed lubricants for approval PRIOR to use on low voltage, A/V, coax, fiber, and data cable installation. Cable lubricants shall be allowed to dry a minimum of 15 days before performing cable certification tests.

I. Cables may be run exposed above accessible ceilings, provided the cabling is supported independent of other utilities such as conduits, pipes, and the ceiling support systems. The Contractor shall include all costs in base bid for any additional supports/seismic bracing required by the Local Authority having Jurisdiction. The cables shall not be laid directly on the ceiling panels.

J. The cable jacket composition must meet local and all other prevailing fire and safety codes.

K. All firewalls penetrated by structured cabling shall be sealed by use of a non-permanent fire blanket or other method in compliance with the current edition of NFPA and the CEC or other prevailing code and must be a system listed by UL. The Contractor must not use concrete or other non-removable substance for fire stopping on cable trays, wireways or conduits. Contractors who use this method will be required to replace all cables affected and provide the original specified access to each effected area. This requirement also applies to maintaining fire ratings of all floors penetrated by conduits or devices designated for use by voice and data cabling.

L. All equipment racks and cabinets shall be bolted to the structural floor by the Contractor in the location shown on drawings. Wall mounted relay rack and wall mounted cabinet kits shall be fastened to structural studs, not drywall or backboard only.

M. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the Contractor before final acceptance at no cost to the Owner.

N. The cable manufacturer’s minimum bend radius and maximum pulling tension shall not be exceeded.

O. Cable raceways, when required, shall not be filled greater than the NEC maximum fill for the particular raceway type. Innerduct fill shall not exceed 40 percent.

P. Contractor shall provide and install all conduit sleeve penetrations through all sound and fire rated assemblies (wall, floor, ceiling) whether or not the sleeves are shown on the plan drawings. Include all costs in base bid. All low voltage cables that penetrate a wall, floor or ceiling shall be enclosed in a conduit sleeve. Penetrations through fire-rated assemblies shall be properly fire stopped to the original fire rating of the assembly by the Contractor.

Q. Roof penetrations are prohibited. No conduit shall be installed on roofs or route horizontally on exterior walls.

3.2 SPECIFIC SYSTEM INSTALLATION REQUIREMENTS

A. All communications cabling used throughout this project shall comply with the requirements as outlined in the NEC Articles 725, 760, 770, and 800 (or related CEC Articles), and the appropriate local codes. All copper cabling shall bear UL listed type CMP (Plenum Rated) and/or CM/G (General Purpose) and/or CMR (Riser Rated). All fiber optic cabling shall bear OFNP (Plenum Rated) and/or OFNR (Riser Rated) and/or OFN/G (General Purpose). The Contractor is responsible for installing appropriately rated cable for the environment in which it is installed.

B. Cable Pathways:

1. In suspended ceiling and accessible ceiling areas where duct, cable trays or conduit are not available, the Contractor shall bundle cable, in bundles of 48 or less. Cable bundles shall be supported via "J" hooks attached to the existing building structure and framework at a maximum of five (5) foot intervals. The Contractor shall adhere to the manufacturers' requirements for bending radius and pulling tension of all cables.
2. Cables or J-hooks shall not be attached to lift out ceiling grid supports or laid directly on the ceiling grid.
3. Cables or J-hooks shall not be attached to or supported by fire sprinkler heads, HVAC ducts, or delivery systems or any environmental sensor located in the ceiling air space.
4. Where additional conduit(s)/sleeve(s) are required, but not provided by the electrical Contractor, the cabling Contractor shall be responsible to provide such conduit(s)/sleeve(s). Conduit(s) and sleeve(s) shall be of suitable material, sized, installed, fire-stopped, and grounded as required by the NEC, ANSI/TIA/EIA standards and all other applicable codes and standards. Any conduit(s) and sleeve(s) added by the Contractor shall be approved by the District's Project Manager prior to rough-in.
5. All J-hooks shall be rated and designed for Category 6 and 6 cabling.

C. Sealing of openings between floors, into or through rated fire and smoke walls, existing or created by the Contractor for placement of new or removal of old cable into or through shall be the responsibility of the Contractor. Sealing material (Approved UL listed system) and application of this material shall be accomplished in such a manner that is acceptable to the local fire and building authorities having jurisdiction over this work. Creation of such openings as are necessary for cable passage between locations as shown on the drawings shall be the responsibility of the Contractor's work. Any openings created by or for the Contractor and left unused shall also be sealed as part of this work.

1. Fire stopping work shall be performed by a single Contractor to maintain consistency and accountability on the project.
2. The Contractor shall install penetration firestop seal materials in accordance with design requirements, and manufacturer's instructions.
3. The Contractor's installer shall be certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements.
4. All installed through penetration firestops shall be identified via label, or stencil. Label shall state that the fill material around the penetrating item is a firestop, and that it shall not be disturbed unless by an authorized Contractor. The label shall include the firestop brand name, and the classified system number for which it was installed.

    a. Sample Label:

    MANUFACTURER'S NAME:
    ATTENTION
    Fire Rated Assembly
    For Any Changes To This System, Please Refer To UL System Listed Below
    PRODUCT:

HOUR RATING:
UL SYSTEM:
INSTALLATION DATE:
INSTALLED BY: (Contractor's Company name)
CONTRACTOR LICENSE NUMBER:
BUSINESS PHONE:
EMAIL ADDRESS:

D. The Contractor shall be responsible for damage to any surfaces or work disrupted as a result of his work. Repair of surfaces, including painting, shall be included as necessary.

E. Cable bundles within the MDF/IDF shall be dressed into bundles of no more than twenty-four (24) cables. Maintain each bundle with half inch-wide hook and loop strips spaced every twelve (12) inches maximum.

F. The Contractor shall install all patch cords per direction of the District's project manager in a neat and systematic fashion. Prior to installing all patch cords, the Contractor shall install patch cords in a single rack to demonstrate work practices to the District's project manager. Only after any corrections/modification to the installation as directed by the District's project manager, may the Contractor continue installing the patch cords in the remaining racks.

G. Each equipment cabinet and rack requires its own dedicated grounding connection to the grounding infrastructure. Grounding infrastructure shall consist of a dedicated #6 AWG (min.) green conductor from every rack/cabinet back to the TMGB/TGB. All ground conductor attachments to the TMGB/TGB shall utilize 2-hole compression lugs. See Section 2.13 Grounding System and Conductors of this document for more information.

H. In raised-floor environments, the ground conductor shall attach to the lowest holes on the front rail of each rack/cabinet.

I. Rack/cabinet mounted equipment shall be grounded via the chassis, in accordance with manufacturer's instructions. The equipment chassis shall be bonded to the rack/cabinet using one of the following methods:

1. If the equipment has a separate grounding hole or stud, use a #10-AWG ground wire from the chassis ground hole/stud to the rack grounding bus.
2. If the manufacturer suggests grounding via the chassis mounting flanges, use tri-lobular thread-forming screws (not self-tapping or sheet metal screws) to attach the equipment to the rack/cabinet rails. If the equipment mounting flanges are painted, remove the paint and apply an anti-oxidant, or use tri-lobular thread-forming screws and two (2) "Type B" internal-external tooth lock washers to safely ground equipment to the rack.

J. Bonding of ladder tray sections- Attach bonding straps to each ladder tray section by utilizing either two (2) tri-lobular thread-forming screws (not self-tapping or sheet metal screws) or by using two (2) standard bolts with two (2) "Type B" internal-external tooth lock washers per bolt. If thread-forming screws are not used, remove paint at each connection point and use an approved anti-oxidant prior to attaching the bonding strap.

K. All installation shall be done in conformance with TIA/EIA 568-C standards, BICSI TDMM guidelines and manufacturer's installation guidelines. The Contractor shall ensure that the maximum pulling tensions of the specified distribution cables are not exceeded and cable bends maintain the proper radius during the placement of the facilities. Failure to follow the appropriate guidelines will require the Contractor to provide, in a timely fashion, any additional material and labor necessary to properly rectify the situation to the satisfaction and written approval of the

District's Project Manager. This shall also apply to any and all damages sustained to the cables by the Contractor during the implementation.

1. Bonding and Grounding: All cable sheaths and splice cases shall be grounded to a Telecommunications Ground Bus. All grounding must be in accordance with the NEC, NFPA, ANSI-J-STD-607-B and all local codes and practices. The Electrical Contractor shall be responsible for providing a properly sized grounding conductor from the main electrical ground to the telecommunications ground bus in each MDF/IDF room. The Contractor shall be responsible to provide the telecommunications busbar, attach the Electrical Contractor-provided ground conductor, and bond all required equipment and components within each MDF/IDF to the busbar.
2. Power Separation: The Contractor shall not place any distribution cabling alongside power lines, or share the same conduit, channel or sleeve with electrical apparatus. Maintain a minimum of 12-inch separation from light fixtures.
3. Miscellaneous Equipment: The Contractor shall provide any necessary screws, anchors, clamps, hook & loop ties, distribution rings, wire molding (MDF & IDF locations), miscellaneous grounding and support hardware, etc., necessary to facilitate the installation of the System.
4. Special Equipment and Tools: It shall be the responsibility of the Contractor to furnish any special installation equipment or tools necessary to properly complete the System. This may include, but is not limited to, tools for terminating cables, testing and splicing equipment for copper/fiber cables, communication devices, jack stands for cable reels, or cable winches.
5. Labeling: The Contractor shall be responsible for printed labels for all pull boxes, conduits, cables, protectors, racks, cabinets, patch panels, connector panels, cords, distribution frames, and outlet locations, according to the specifications. Hand written labels are prohibited. See LABELING REQUIREMENTS Section 3.9 of this document for more information.
6. Cable Storage: The Contractor shall not roll or store cable reels without an appropriate underlay and the prior written approval of Owner's Project Manager.
7. Cable Records: The Contractor shall maintain conductor polarity (tip and ring) identification at the main equipment room (switch room), risers, and station connecting blocks in accordance with industry practices, but only in locations authorized by the Owner's Project Manager. Contractor to provide spread sheet for all outdoor backbone and indoor riser backbone cables tested.

3.3 STRUCTURED CABLING GENERAL INSTALLATION DESCRIPTION

A. The structured cabling system shall consist of any or all of the following subsystems:

1. Work Area Subsystem
2. Horizontal Subsystem
3. Administration Subsystem
4. Backbone Subsystem
5. Equipment Subsystem

B. Work Area Subsystem: The Work Area Subsystem provides the connection between the telecommunications outlet (TO) and the station equipment in the work area. It consists of cords, adapters, and other transmission electronics.

1. Contractor shall supply the wiring or cords that connect terminal devices to telecommunications outlets. This includes mounting cords and connectors, as well as extension cords.

C. Horizontal Subsystem: The Horizontal Subsystem provides connections from the horizontal cross connect to the telecommunications outlets in the work areas. It consists of the horizontal transmission media, the associated connecting hardware terminating this media and outlets in the work area. Each floor of a building is served by its own Horizontal Subsystem(s).

1. Horizontal Cabling

a. Workstation wiring will be Category 6, 4-pair, 23 AWG, UTP cable [Blue] as defined in EIA/TIA 568-B Draft 11 CMP or CMR depending upon the environment. Wireless Access Point locations will be Category 6A [Green]

b. Acceptable products shall meet or exceed EIA/TIA 568B Draft 11, certified Category 6. Part numbers are:

Manufacturer	**CMR**	**CMP**	**OSP**
Berk-Tek CAT6	10136339	10136226	10139885
Berk-Tek CAT6A	11140412	11140404	

c. Buildings/locations served will utilize a network of false-ceiling bundle, surface-mount raceways, and/or conduit (underground, overhead) for all data related cable installation as per drawings. The Contractor is to confirm that the installation will adhere to all applicable building and fire codes including NEC and UL Listings.

d. All distribution horizontal Category 6 and 6A cables shall be terminated at the appropriate number of rack mounted Category 6 patch panels. Terminated cables must be secured to lacing bar on the rear of the patch panel utilizing Velcro straps.

e. Category 6/6A patch cords and drop cords shall be provided. One (1) 1 ft. cord for the MDF/IDF and a (1) 7 ft. cord for each outlet jack port. Part numbers are:

Cat6 Leviton 6D460-01L (1 ft), 62460-7L (7 ft)
Cat6A Leviton H6A10-1G (1 ft); H6A10-7G (7ft)
In instances where longer cords are required, the contractor is to clarify the requirement with the District before installing or providing any longer cords.

f. A standard 12-inch service loop shall be provided at the end (IDF) of each UTP cable run.

g. In plenum return locations, any required cabling that is not completely installed in conduit shall be plenum rated.

h. All inter-building cabling shall be duct rated (voice tie cable, backbone and backbone extension fiber-optic, not including horizontal fiber).

i. The cable routing to all work locations will be above false-ceilings, in crawl space access, in existing interior or exterior conduit, conduit risers, and/or in surface mounted raceway systems. No cabling shall be exposed except for patch cables between fiber patch, wiring termination equipment and active hardware.

j. All horizontal distribution cable shall be installed in one continuous segment from the IDF to the wall plate (home run). No splicing or consolidation points are permitted unless pre-approved by the District.

k. All cable that must be surface-mounted must run at right angles to the walls and ceiling, emanating from a central run from the IDF.

l. All surface mount raceways must be screw-mounted to wall studs at intervals not to exceed 3 feet.

m. All cable installed above false ceilings must emanate from the IDF in one bundled group and cable tied to suspension wires so as not to lay on top of ceiling tiles, wiring, ducting, electrical conduit, lighting fixtures or other equipment existing above the false ceiling. All cabling not in conduit shall be supported by J-hook hardware at maximum 5-foot intervals. Velcro straps shall secure the cable bundle at intervals not to exceed 5 feet.

n. All cable installed below floors and in crawl spaces must emanate from the IDF or locking cabinet in one bundled group, Velcro strapped mounted onto floor joists using wire saddle-type accessories at intervals not to exceed 5 feet.

o. Following is the standard for all workstation terminations:

i. Outlets with one or two terminations will use single-gang, dual-port face plates. Outlets with three or four terminations will use single-gang, four-port face plates. Specific part numbers will be determined by the District based on the requirements of the project.

ii. All unused ports will be filled with blank inserts.

iii. The 568B wiring method shall be adhered to for all terminations.

p. UTP Test Parameters

i. All cabling - continuity, opens, breaks, shorts, and grounds.

ii. Near-end cross talk (NEXT), impedance, capacitance, and resistance.

Minimum Installed Link Test Standards

Frequency	Attenuation dB/1000' (Worst Pair)	Power Sum Near-End Crosstalk (dB) (Worst Pair)
250mhz	67	32.7

Minimum Cable Performance Standards

Impedance	100 ohms +/- 25 ohms at 200-250mhz
Delay Skew	25 max ns/100m maximum
DC Resistance	9.38 ohms/100m maximum
Attenuation	32.8 db/100m maximum at 20dg C
PS-ACR	3.5 db/100m minimum
PS-NEXT	36.3 db/100m at 250mhz

D. Administration Subsystem: The Administration Subsystem links all of the subsystems together. It consists of labeling hardware for providing circuit identification and patch cords or jumper wire used for creating circuit connections at the cross connects. All wall field layouts must be approved by Owner's Project Manager prior to rough-in and installation.

1. Separate termination fields shall be created for voice/data, wireless access points, paging, surveillance cameras, clocks, and building energy management system applications.

2. Termination blocks that require rotation after connection of horizontal/vertical wiring will not be allowed.
3. Contractor shall supply cross-connect wire, patch cords and fiber patch cords for cross-connection and inter-connection of termination blocks and lightguide interconnection units.

E. Backbone Subsystem:

1. Backbone fiber-optic cabling: The distributed cabling architecture will require 6-strand single-mode optical cable for backbone connectivity between the MDF and each IDF.

   Part number: Berk-Tek PDP006AB0707-I/O-C4

2. A standard 3-meter service loop shall be provided at the end of each fiber-optic cable run at termination point.

3. All new fiber-optic terminations shall use LC connectors with ceramic ferrules. All fibers shall have LC connections at the fiber patch panel or LIU.

   Part number: Leviton FastCam 49991-SLC SM

4. A 2-meter LC to LC duplex single-mode fiber-optic patch cable is to be provided for each main fiber connection at both the MDF and IDF location. A minimum of two (2) per 6 strands fiber-optic cable installed.

   Part number: Leviton PCF-S2PD1RR-0020MAB

5. MDF fiber patch shall be a rack mountable multi-fiber enclosure with required brackets, panels, and related hardware to terminate multiple, fiber-optic cables. One 6-port LC duplex panel shall be installed for every 6-strands of fiber-optic cable installed. All empty slots in fiber enclosures are to be fitted with blank panels.

   Part numbers are:

1U enclosure	Leviton 5R1UM-F03
2U enclosure	Leviton 5R2UM-F06
OS1 coupler (12 fiber)	Leviton 5F100-2LL
Enclosure blank panel	Leviton 5F100-PLT

6. All fiber-optic cabling is to be terminated and tested at the MDF and IDF locations. Testing shall meet or exceed TIA/EIA-568-A and TIA/EIA-568-B.1 and B.3.

7. All exposed fiber-optic cable shall be enclosed in inner-duct to a maximum 40 percent fill ratio Inner-duct is not required within inter-building conduit.

8. MDF/IDF UTP Termination Equipment

a. The horizontal cross-connect for data circuits shall consist of patch cords from the horizontal termination panels to the network equipment within the same or adjacent racks. Patch panels shall be 48 modular jack ports of the appropriate color, wired to T568B, with wire management. Patch panels shall terminate the building cabling on 110-style insulation displacement connectors. Patch panels must be UL listed under file number E81956. 24-port patch panels are not to be used without prior district approval.

Part number: Leviton 49255-H48 (see Section C for modular jack part numbers)

b. A 1U horizontal cable management bracket shall be installed immediately below each patch panel.

Part number: Leviton 491RU-HFR

c. CAT6 and CAT6A cables may be terminated on the same patch panel as long as the appropriate modular jacks are used (black for CAT6 and green for CAT6A). The last four ports in each row of the panel are reserved for CAT6A use (i.e. ports 21-24, 45-48).

d. A 1U space will be left open immediately below the cable management bracket before mounting the next patch panel. This space will be reserved for installation of a 1U switch to service all ports on the patch panel immediately above the cable management bracket.

9. No splicing is permitted anywhere for any copper cabling.

3.4 DAMAGES

A. The Contractor will be held responsible for all damages to portions of the building caused by it, its employees, or sub-Contractors; including but not limited to:

1. Damage to any portion of the building caused by the movement of tools, materials, or equipment.
2. Damage to any component of the construction of spaces.
3. Damage to the electrical distribution system.
4. Damage to the electrical, mechanical and/or life safety or other systems caused by inappropriate operation or connections made by the Contractor or other actions of Contractor.
5. Damage to the materials, tools and/or equipment of the Owner, its consultants, agents, and tenants.

3.5 PENETRATIONS OF WALLS FLOORS AND CEILINGS

A. Unless specifically shown on the drawings, the Contractor shall make no penetration of floors, walls, or ceiling without the prior written approval of the Owner’s Project Manager.

B. Any penetrations through acoustical walls or other walls for cable pathways/cables shall be sealed by the Contractor in compliance with applicable code requirements and as directed by Owner’s Project Manager.

C. Any penetrations through fire-rated walls for cable pathways/cables shall be sealed by the Contractor as required by code and as directed by Owner's Project Manager. The Contractor shall be required to work together with the General Contractor and the Electrical Contractor to coordinate and develop all fire stopping methods prior to any cable installation. The Contractor

shall also, prior to the commencement of on-site activities, submit to Owner's Project Manager, details of any special systems to be used.

D. Roof penetrations are prohibited. No conduit shall be installed on roofs or route horizontally on exterior walls.

3.6 TESTING AND WARRANTY

A. Structured Cabling System

1. The Contractor shall provide competent, test equipment manufacturer-trained engineers and/or technicians, authorized by the manufacturer of the cabling system, to technically supervise and participate during all tests for the systems.
2. The Contractor shall test and certify the cabling system to minimum standards as set forth in the TIA/EIA-568-C specifications for 100BaseTX Ethernet and for Category 6 cable, token ring, and 1000baseT signals.
3. All cables and termination hardware shall be 100% tested for defects in installation and to verify cable performance under installed conditions. All conductors of each installed cable shall be verified usable by the Contractor before system acceptance. Any defect in the cable system installation including but not limited to cable, connectors, feed-through couplers, patch panels, splices, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.
4. Each cable shall be tested for continuity on all pairs and/or conductors. Twisted-pair voice cables shall be tested for length, continuity, pair reversals, opens, shorts, transpositions, presence of AC and DC voltages and opens. Twisted-pair horizontal cables shall be tested for the all of the above requirements, plus tests that indicate installed cable performance. Catgegory-6 cables shall be tested using a TIA-568-C.2-1 Category 6 Level III/IEC 61935 Level III or better, ETL certified cable tester/analyzer.
5. Shielded/screened cables shall be tested with a device that verifies shield continuity in addition to the above stated tests.
6. The test shall be recorded as pass/fail as indicated by the test set in accordance with the manufacturers recommended procedures and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested before final acceptance.
7. Each installed cable shall be tested for installed length using a Time Domain Reflectometer (TDR) type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the TIA-568-C Standard. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number.
8. Multi-pair cables, record the following tests on every cable pair in each multipair cable using a TDR type device: record the shortest pair length, continuity, pair reversals, shorts, opens, transpositions, presence of AC and DC voltage.
9. Category 6 data cable shall be performance verified using an automated test set. This test set shall be capable of testing for the continuity and length parameters defined above, and provide results for the following tests:

    a. Attenuation (Insertion Loss).
    b. Return Loss (RL).
    c. Near End Crosstalk (NEXT) – measured at both ends of each cable pair.
    d. Attenuation to Crosstalk Ratio (ACR).
    e. Power Sum Near End Crosstalk (PSNEXT).
    f. Power Sum Attenuation to Crosstalk Ratio (PSACR).
    g. Far End Crosstalk (FEXT).
    h. Equal Level Far End Crosstalk (ELFEXT).

i. Power Sum Equal Level Far End Crosstalk (PSELFEXT).

10. Test results shall be automatically evaluated by the equipment, using the most up-to-date criteria from the ANSI/TIA/EIA Standard, and the result shown as pass/fail. Test results shall be printed directly from the test unit or from a download file using an application from the test equipment manufacturer. The printed test results shall include all tests performed, the expected test result, and the actual test result achieved.
11. Optical Fiber Cable Testing: All fiber testing shall be performed on all fibers in the completed end to end system by test equipment manufacturer-trained engineers and/or technicians. There shall be no splices unless clearly defined in Section 3 of this specification or on the plan drawings. Testing shall consist of a bi-directional end to end OTDR trace performed per ANSI/TIA/EIA 455-61 & ANSI/TIA/EIA 526 and a bi-directional end to end power meter test performed per ANSI/TIA/EIA 455-53A. The system loss measurements shall be provided at 850 and 1300 nanometers for multimode fibers and 1310 and 1550 for single mode fibers.

    a. Pre-installation cable testing: The Contractor shall test all fiber optic cable prior to the installation of the cable. The Contractor shall assume all liability for the replacement of the cable should it be found defective during the warranty period.
    b. Loss Budget: Fiber links shall have a maximum loss of: (allowable cable loss per km) x (km of fiber in link) + (.4dB) x (number of connectors) = maximum allowable loss.
    c. Any link not meeting the requirements of the standard shall be brought into compliance by the Contractor, at no additional charge to District.

12. The Contractor shall provide test documentation to the District's Project manager in a three-ring binder(s) and in CD format within three weeks after the completion of a specific project. The binder(s) shall be clearly marked on the outside front cover and spine with the words "Test Results", the project name, and the date of completion (month and year). The binder shall be divided by test type. A paper copy of the test results shall be provided that lists all the links that have been tested, and include link name, overall pass/fall evaluation, date and time of test, cable type and NVP value. Detailed test results shall be provided for each link tested and shall include length, propagation delay, delay skew, insertion loss, return loss, NEXT, ELFEXT, ACR, PSNEXT, PSELFEXT, and PSACR. Detailed test results for each link will also include customer site name, name of standard selected to execute the tests, date and time test results were saved in memory of test unit, brand name model and serial number of tester and revision of the tester software and test standards database in the tester. Individual test data within each section shall be presented in the sequence listed in the test summary records. Unless a more frequent calibration cycle is specified by the manufacturer, an annual calibration cycle is anticipated on all test equipment used for this installation.
13. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be collocated in the binder.
14. The entire SCS system shall be warranted free of mechanical or electrical defects by the Contractor for a period of one year after final acceptance of the installation.
15. Any equipment that is not installed per the manufacturer's recommendation shall be replaced promptly and at no cost to the District.
16. Any material showing mechanical or electrical defects shall be replaced promptly at no expense to the District.
17. Provide all labor and material warranties for each system, as described elsewhere in this document.
18. At the District's direction, the Contractor shall perform additional random testing which shall consist of a random sample of up to 10% of each installation distribution system. The Contractor shall assume responsibility for providing the proper test equipment and staff to conduct tests. The District's representative shall witness the tests.

19. Should the initial 10% test not be 100% successful (all drops testing over CAT6 up to 250MHz), the Contractor shall assume responsibility to repair/replace non-passing links, at the direction of the District, and the links to re-verify and resubmitted. A 20% random sample shall then be conducted to ensure proper performance of the system.
20. Should there be failure in this re-test, the Contractor shall be responsible to repeat the re-test procedure until such time as all cabling is verified.
21. The Contractor facilitates a manufacturer's warranty on the cable plant system, in writing, against defects in workmanship and material for a Leviton Limited Lifetime Warranty after final acceptance or from the date of first usage of the work by District personnel. The warranty must also include a system warranty for performance specifications to meet or exceed the industry accepted standards at the time of installation. The warranty shall include all future applications that are designed to operate on a 200mhz platform. The first usage date shall be agreed to be in writing by the owner and contractor within five (5) working days of first usage. During this time, the entire system must be kept in proper operating condition at no additional labor or material cost to the District.
22. The manufacturer of the major components will maintain a replacement parts department and provide test equipment when needed. A complete parts department will be located in a geographical proximity consistent with rendering service within the stated agreement.
23. Potential end-user actions, which may void the warranty shall be identified and submitted for District's approval prior to start of installation.

3.7 Fiber Test Parameters

a. Backbone multi-mode fiber shall be bi-directionally tested at both 850nm and 1300 nm in one direction. Backbone single-mode fiber shall be tested at both 1310nm and 1550nm. Test set up and performance shall be conducted in accordance with ANSI/EIA/TIA-526-14 Standard, Method B.
b. Where concentrated links are installed to complete a circuit between devices, the Contractor shall test each link from end to end to ensure the performance of the system. After the link performance test has been successfully completed, all patch cords shall be installed to complete, and then the entire channel shall be tested. The evaluation criteria shall be established between Romoland School District and the contractor prior to the start of the test. The values for calculating loss shall be those defined in the ANSI/TIA/EIA Standard.
c. Attenuation testing shall be performed with a stable launch condition using two-meter jumpers to attach the test equipment to the cable plant. The light source shall be left in place after calibration and the power meter moved to the far end to take measurements.
d. Any fiber-optic pairs not meeting the minimum ANSI/EIA/TIA Standard specifications shall be repaired or replaced by the Contractor at the option of the District.

Typical fiber-optic Test Standards

Test Parameters	Multi-mode 850nm and 1300nm 50/125 micron	Single-mode 1310nm and 1550nm 8.3/125 micron
Max. Attenuation (dB/km)	2.6/2.0	0.70/0.70
Minimum Bandwidth (MHz-km)	500-500	

10. The contractor shall be responsible for the successful testing of all copper and fiber-optic terminations per TIA/EIA- 568-B specifications and ANSI/EIA/TIA Standard respectfully.
    a. The installation shall be tested to meet or exceed the TIA/EIA-568-B Channel test specifications. Any discrepancies are to be resolved prior to acceptance by the district. Testing is to ensure performance to TIA/EIA-568-B Category 6 up to 250 MHz.

b. Prior to the acceptance tests, an acceptance test plan is to be provided to the District for their approval. Additionally, the District management and/or appointed representatives reserve the right to witness the testing process.
c. All cable and termination hardware shall be 100% tested for defects in installation and to verify cable performance under installed conditions. All conductors of each installed cable shall be verified usable by the contractor prior to system acceptance. Any defect in the cable system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% usable conductors in all cables installed. Twisted pair cables shall be tested using a Class II cable analyzer. All installed cabling shall be 100% tested and certified.
d. Test documentation shall be provided as an electronic file within three weeks after the completion of the project. The electronic documents shall be clearly marked with the words “Test Results,” project name, and date of completion (month and year). The electronic document shall be divided by major heading tabs, Horizontal and Backbone.

11. At the District’s direction, the contractor will perform additional random testing which shall consist of a random sample of up to 10% of each installed distribution system. The contractor shall assume responsibility for providing proper test equipment and staff to conduct tests. The District representative reserves the right to witness any or all tests performed.
12. Should the initial 10% test not be 100% successful (all drops testing over Category 6 up to 250 MHz), the Contractor shall assume responsibility to repair/replace non-passing links, at the discretion of the District, and the links re-verified and resubmitted. A 20% random sample shall then be conducted to ensure proper performance of the system.
13. Should there be a failure in this re-test, the vendor shall be responsible to repeat the re-test procedure until such time as all cabling is verified.

At project completion, contractor must provide accurate drawings to scale in CAD format.

3.8 COMPLETION OF WORK:

A. At the completion of the Systems, the Contractor shall restore to its former condition, all aspects of the project site and daily, shall remove all waste and excess materials, rubbish debris, tools and equipment resulting from or used in the services provided under this Contract. All clean up, restoration, and removal noted above will be by the Contractor and at no cost to Owner. If the Contractor fails in its duties under this paragraph, Owner may upon notice to the Contractor perform the necessary clean up and deduct the costs thereof from any amounts due or to become due to the Contractor. It shall be the Contractor's responsibility to remove trash from the areas it is working in and bring trash and debris to the Contractor provided dumpster.

3.9 INSPECTION

A. On-going inspections shall be performed during construction by the District’s representative. All work shall be performed in a high-quality manner and the overall appearance shall be clean, neat and orderly. Any work that does not meet the District’s representative’s approval shall be removed and reinstalled by the Contractor at no additional cost to the District.

3.10 LABELING REQUIREMENTS

1. All cables, outlets, and terminations shall meet UL969 legibility, defacement and adhesion requirements and designated as specified below. ***Always confirm with the District prior to termination in the network closet.***

The format for the outlet labeling will be the IDF designation, followed by the patch panel identifier, followed by the port number on the panel. Within each area

for new installations, numbering is to increase consecutively beginning with the general use locations (for a classroom, teacher locations first followed by other classroom locations), followed by wireless, then projector/paging/camera (if applicable). Individual outlet numbering will be left to right across the top row, continuing left to right on the next row and so on.

Samples:
B-A-5 = IDF B, Panel A, Port 5
200-C-48 = IDF 200, Panel C, Port 48

2. IDF naming is the building number as defined on the site's as-built plans. In the absence of a building number the district will dictate the IDF number to use. IDF must contain a label on the fiber patch panel/LIU indicating the IDF number. UTP Patch panels in the IDF are labeled with a panel designation, beginning with "A" for the top panel and increasing alphabetically moving down. All runs back to a specific IDF are to terminate on the next available port on the patch panel, only moving to the next panel when full. Each port on the panel will be labeled above the port with the location where the run terminates. For this labeling a Room/Office number will suffice if available, otherwise other designations may be used and must be submitted to the District for approval.

Sample IDF label on fiber patch panel:
IDF A
IDF 300
Sample UTP patch panel label in IDF:
12 = Classroom 12
HALL = Hallway
EXT-W = Exterior West

3.11 MISCELLANEOUS PROJECT REQUIREMENTS

A. Site Cleaning: Throughout the progress of the plant construction, the Contractor shall keep the working area free from debris of all types and remove from the premises all rubbish resulting from any work done by Contractor. On a daily basis and at the completion of its work, the Contractor shall, to the extent possible, leave the premises in a clean and finished condition.

B. Conduits: All backbone cabling will run through dedicated conduits. All new conduits will be supplied with a pull string. Contractor shall supply pull string and pull rope for the installation of all cables in existing conduits. For all conduits left with available capacity, Contractor shall replace pull strings with ¼-inch pull rope during the course of his work. Contractor must seal all underground low voltage conduits within manholes, underground vaults/pull boxes, and underground conduits that enter a facility, with an approved mechanical water/gas/air tight plug. Unused conduits shall be sealed with a blank plug.

C. Seismic Requirements: Contractor will install all equipment racks, equipment cabinet enclosures, cable runways, etc. according to DSA and local, state and/or federal code. Contractor will notify District's Project Manager of such requirements and shall provide such bracing as required. Contractor to coordinate all installation with the structural Engineer of Record.

D. Safety Requirements: Contractor will utilize appropriate personnel and display warning signs, signals, flags and/or barricades at the work site to ensure adherence to safety regulations and as prudence requires.

E. Specification/Drawing Status: All specifications and drawings related to this project will be "frozen" after shop drawing approval. The District reserves the right to negotiate any future changes with the Contractor at any time.

3.12 MISCELLANEOUS SUPPORT REQUIREMENTS

A. Upon approval of shop drawings, Contractor shall immediately place orders for all required materials, components, and supplies. In addition, Contractor shall secure and forward written confirmations (including orders and shipping dates) direct from each manufacturer/vendor to the District's Project Manager.

B. Contractor shall expedite shipment of all materials, components, and supplies, as necessary to ensure the successful completion of the Project by the date required. All costs for expediting shall be included within Contractor's pricing as provided below.

C. The system cost herein shall include administration/maintenance training for at least five (5) District representatives with a minimum allotment of two (2) eight-hour sessions. All training shall include written and/or video materials that shall remain the property of District. If materials are written, they shall be provided in quantities sufficient for each person trained; if materials are video, one (1) copy of each will be required. The administration/maintenance training shall include, but not be limited to, the following:

1. Review of as-built documentation, including a site demonstration.
2. All warranty information.

D. Minimum standards for maintenance purposes shall include optional access to service on a 24 hour-a-day, 365 day-a-year basis. In addition, Contractor shall, upon notification, respond as follows:

1. Emergency Response: Contractor must respond by utilizing remote diagnostics capabilities (as applicable) within thirty minutes of notification. If necessary, Contractor must dispatch at least one certified technician for arrival on-site within two hours of notification.
2. Non-Emergency Response: Contractor shall respond by utilizing remote diagnostics capabilities and or cause dispatch of at least one certified technician for arrival on-site within one business day of notification.
3. Definition of "Emergency": For maintenance purposes, "emergency" shall be defined as one or more of the following conditions:

    a. Defects of any riser pairs and/or components involving at least ten percent (10%) of any riser cable's capacity.
    b. Defects of station cable pairs and/or components involving at least ten percent (10%) of any department or group of voice and/or data stations.
    c. Defects significantly impairing any single attendant console.
    d. Defects of any fiber optic cable and/or components involving at least ten percent (10%) of any department or group's fiber-based systems and/or stations.
    e. Any pre-defined failure as submitted by District and agreed to be Contractor.

3.13 FINAL ACCEPTANCE

A. The District or District's representative may visit the site during the installation of the system to ensure that correct installation practices are being followed.

B. The District or District's representative will conduct a final job review once the Contractor has finished the job. Review will take place within one (1) week after the Contractor notifies District.

C. Two (2) copies of all certification data and drawings for all identifications shall be provided to the District before the District's review.

D. The District or District's representative will review the installation and certification data prior to the system acceptance.

E. The District or District's representative may test some of the systems features to ensure that the certification data is correct. If a substantial discrepancy is found, the District reserves the right to have an independent consultant perform a certification of the entire system. If such a procedure is undertaken, the cost of the testing will be billed back to the Contractor.

F. If repairs or adjustments are necessary, the Contractor shall make these repairs at his own expense. All repairs shall be completed within ten (10) days from the time they are discovered.

G. The Contractor shall provide two (2) copies of an "operating and servicing manual" for the system within fourteen (14) calendar days of District's final acceptance of the system. The manuals shall be bound in flexible binders. All data shall be printed material or typewritten. Each manual will include the following: instructions necessary for proper operation and servicing of the system; complete as-built installation drawings of the system (11"x17"); equipment specification cut sheets, complete performance test data, complete warrantee information and replacement parts list with current prices listed, contact information for repair and warranty work requests.

1. The Contractor shall mount a full size 30" x 42" bond copy of each scaled Site Plan within MDF room and each IDF room with removable Plexiglas front cover. Frame and cover shall be sized to house the site plan and floor plan drawings. Coordinate location of frame with District's Project Manager prior to installation.
2. The Contractor shall hand to the District a copy of any applicable installation specific software configurations including all log-in passwords in CD format.

END OF SECTION 27 10 00

SECTION 27 30 00
PUBLIC ADDRESS AND PAGING SYSTEM

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. The work under this section includes all final design, all labor, material, equipment, supplies, labor, testing, and accessories required to furnish and install a complete Audio Paging Systems as indicated on the drawings and as specified herein.

B. It is the intent of the Drawings and Specifications, which are presented in a "design-build" format, for the Contractor to design, provide and install a complete, fully operational, and tested system.

C. All miscellaneous system components including, but not limited to, cables, termination equipment, punch blocks, patch panels, backboards, and any other related items shall be furnished and installed complete under this section, such that the system shall perform all functions listed herein in compliance with all of the specified requirements.

1.02 RELATED WORK

A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and sections of Divisions 1 and 26 of these specifications.

B. All applicable portions of Section 16010 shall apply to this section as though written herein completely.

1.03 RESPONSIBILITIES

A. Contract documents are detailed only to the extent required to show design intent. It shall be understood and agreed upon by the Contractor that all work described herein shall be complete in every detail.

B. Furnish additional items not mentioned herein to meet requirements as specified without claim for additional payments. Items may include hardware, rack panels, appropriate connection blocks, and all other parts that are required for installation.

C. Labor furnished shall be trained and experienced in telecommunication systems.

D. All equipment unless otherwise specified, shall be new, free from defects, and the best craftsmanship in its class.

E. All manufactured equipment shall be installed as recommended by the manufacturers, or as indicated in their published installation manual.

F. Furnish and install necessary equipment, back boxes, supports and enclosures.

G. Furnish and install all necessary wire.

H. Furnish shop drawings.

I. Perform final programming of system and audio level adjustments.

J. Provide system documentation including equipment manuals and drawings.

K. Guarantee all equipment and components for their specified period from date of acceptance.

L. Provide information on system requirements to any Contractor responsible for supplying related materials for this system.

1.04 GENERAL REQUIREMENTS

A. The contractor shall hold a valid State of California C-7 and/or C-10 license, shall have completed at least 20 projects of equal scope, shall have been in business of furnishing and installing systems of this scope and magnitude for at least five years, and capable of being bonded to assure the owner of performance and satisfactory service during the guarantee period.

B. The contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction over the work.

C. All work shall be performed under the supervision of a company accredited by the basic equipment manufacturer and such accreditation must be presented.

D. The installing contractor shall be a factory authorized distributor and warrantee station for the brand of equipment offered and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The installing contractor shall maintain a spare set of all major parts for the system at all times. All circuit boards, amplifiers and control sub systems shall be 100% backed up with stock at contractors shop.

E. All of the equipment in this specification shall be furnished and installed by the Authorized Factory Distributor of the equipment. The Contractor shall furnish a letter from the manufacturer of all major equipment, which certifies that the installing contractor is the Authorized Distributor and that the equipment has been installed according to factory intended practices. The Contractor shall also furnish a written guarantee from the manufacturer that they will have a service representative assigned to this area for the life of the equipment.

F. All communication systems supplied shall be listed by Underwriter's Laboratories. A copy of the UL listing card for the proposed system shall be included with the contractor's submittal.

G. All of the equipment in this specification shall be furnished and installed by the Authorized Factory Distributor of the equipment with the most current software package available at the time of installation. At the time of Owner Acceptance of the installation, all equipment shall include any and all updated software revisions. In addition, when the software is available in disk format, a backup copy of the most up to date revision, in disk format, shall be handed to the Owner at the completion of the project.

1.05 QUALITY ASSURANCE

A. In order to maintain a high degree of quality assurance, the contractor shall, without exception, use the parts and supplies as specified in this specification.

B. For any proposed substitution, a complete descriptive, technical and cost comparison, and test report package shall be submitted to the Owner for review five (5) working days prior to the bid date. Final approval of the substitution item shall be at the option of the Owner, and written notice of the status of the proposed alternative will be supplied to all bidders prior to the final bid date. The Owner or its representative must approve any proposed substitution item in writing. The Owner reserves the right to require a complete sample of any proposed equal item and may, if necessary, request a sample tested by an independent testing consultant to prove equality. The decision of the Owner regarding equality of proposed equal items will be final.

C. It is the intent of these specifications to establish a standard of quality for labor and material to be installed. The Base Bid shall include materials as specified - without exception. Proposed substitutions, if approved in writing by the Owner,

shall be listed on the bid form in addition to the specified materials.

D. Approved equal status does not imply final acceptance. Final acceptance of a substitution item shall be made by the Owner prior to the award of bid to the successful contractor, after reviewing the bid information.

E. If a substitution item is given final acceptance by the Owner, the Contractor shall reimburse the Architect for any additional engineering charges and shall pay all charges of other trades resulting from the substitution, at no cost to the Owner.

F. If a substitution item is given final acceptance by the Owner, the contractor shall pay all charges (including travel, lodging, meals, etc...) required to provide factory certification, equal to that of a Factory Authorized Distributor of the substituted item, for two (2) selected Owners representatives. This training shall occur at the primary factory of the substituted item in question and shall allow the selected Owners representatives to provide any and all Factory / Manufacturer Approved repairs, services, software upgrades, etc... without affecting any available or applicable Manufacturer Warranties.

1.06 SUBMITTAL AND MANUAL

A. Comply with all requirements of the General Conditions, Supplementary Conditions and applicable sections of Divisions 1 and 16 of these specifications.

B. Additional requirements of this section are:

1. Within thirty-five (35) calendar days after the date of award of the Contract, the Contractor shall submit eight copies of the complete submission to the Architect for review.

2. The submission shall consist of five major sections with each section separated with index tabs. Each page in the submission shall be numbered chronologically and shall be summarized in the index.

3. The first section shall be the "index" which shall include the project title and address, name of the firm submitting the proposal and name of the Architect.

4. The second section shall include a copy of the Contractors valid C-7 and/or C-10 California State

Contractors license, a list of 20 projects of equal or greater scope, and a list of proposed instrumentation to be used by the contractor. In addition, provide a written notice guarantying the provision of the requested warranty.

5. The third section shall contain the comparative specification listing, including a complete listing of the characteristics of the equipment to be furnished next to all of the specified equipment's features and functions as stated in the specifications and data sheets.

6. The fourth section shall contain an original factory data sheet for every component in the specifications.

7. The fifth section shall contain a designation schedule for each System component location and complete 1/8" = 1'-0" scale, 30" x x42" drawing showing system wiring plans and data showing loudspeaker coverage using the EASE Computer Aided Design Program. Provide drawings at 250, 500, 1000, 1000, 2000 and 4000Hz for each device and for all devices together.

C. Failure to comply with all of the requirements listed above will result in the rejection of the entire submittal package.

D. The Contractor shall provide two copies of an "Operating and Servicing Manual" for the system. The manuals shall be bound in flexible binders. All data shall be printed material or typewritten. Each manual shall include the following: Instructions necessary for the proper operation and servicing of the system; complete as-built installation drawings of the system; a wiring destination schedule for each circuit leaving for each piece of equipment; a schematic diagram of major components.

1.07 GENERAL SYSTEM PRODUCT, INSTALLATION AND OVERALL SYSTEM WARRANTY

A. Prior to Owner acceptance, the contractor shall provide to Owner, a manufacturers product and performance warranty. This will require a submittal of the required pre-job certification registration forms as well as the required project closing information. The Owner will only acknowledge acceptance upon submittal of a valid manufacturers warranty.

B. The warranty shall commence from the date of final written acceptance by the Owner.

C. All conditions for obtaining the manufacturers warranty shall be the sole responsibility of the contractor.

D. The contractor shall maintain a competent service organization and shall, if requested, submit a service maintenance agreement to the owner after the end of the guarantee period.

E. A typewritten notice shall be posted at the equipment rack that shall indicate the firm, address and telephone number to call when service is necessary. The notice shall be mounted in a neatly finished metal frame with a clear plastic window and securely attached to the inside of the door.

1.08 SPECIFIC SYSTEM PRODUCT, INSTALLATION AND OVERALL SYSTEM WARRANTY

A. The entire system shall be warranted free of mechanical or electrical defects for a period of one (1) year after final acceptance of the installation. Any material showing mechanical or electrical defects shall be replaced promptly at no expense to the Owner.

PART 2 – SYSTEM EQUIPMENT SPECIFICATION

2.01 ACCEPTABLE MANUFACTURERS

A. All equipment listed herein shall be by Rauland Telecenter ICS to meet existing District standards. No substitutions shall be accepted.

B. It is the responsibility of the bidder to ensure that the proposed product meets or exceeds every standard set forth in these specifications and the equipment's technical data sheets.

C. The functions and features specified are vital to the operation of this facility. Therefore, inclusion of a component's manufacturer in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.

2.02 SYSTEM FUNCTIONS AND CAPABILITIES:

A. The paging system shall provide clear, natural sound uniformly distributed throughout the designated areas.

B. Provide complete and satisfactorily operating Integrated Intercom/Communications System as described herein, using materials and equipment of types, sizes, ratings, and performances as indicated. Use materials and equipment

that comply with referenced standards and manufacturers standard design and construction, in accordance with published product information. Coordinate the features of all materials and equipment so they form an integrated system, with components and interconnections matched for optimum performance of specified functions.

C. The system shall utilize speakers as shown on the Plans. If additional speakers are needed to meet the requirements sections C thru G below, the contractor shall include all costs for added speakers in the base bid.

D. Features offered by this system shall be implemented and controlled by software programs that can be changed and expanded as customer needs evolve.

E. Amplified two-way voice communication shall be available from any dial phone in the system, through any speaker in the system. This shall allow hands-free communication to any classroom or any individual loudspeaker unit. A programmable pre-announce tone shall sound immediately before the intercom path is opened and a supervisory tone shall continue to sound at regular intervals when speaker monitoring is active.

F. The system shall have adequate dynamic range without audible clipping or distortion to accommodate all types of program material. Electronic equalization shall be employed to insure smooth frequency response and high acoustical gain before feedback. When at maximum level, the system shall operate without audible distortion, rattles and buzzes. All switching shall be silent and without pops and transients.

G. The system frequency response, when measured on-axis of the central cluster, shall be within + - 2dB from a curve which is flat from 80Hz to 4kHz and decreasing 3dB per octave from a relative level of 0 dB from 4kHz to 10kHZ. There shall be a minimum 12dB roll-off above 10 kHz and below 63 Hz. Uniformity of coverage of the system at seated ear height (42") shall be within + - 3dB in the 4kHz 1/3 octave band at any seat location using pink noise as a test signal.

H. System noise shall not exceed an equivalent input noise of -120dB based on a 20KHz-noise bandwidth. The predominant noise component in the system output under any operating condition shall be that of the input stage.

I. The sound level capability of program material levels produced in all seats shall be at least 90dB when measured with a scale filter. There shall be at least 6dB of amplifier

headroom. When driven to maximum output, clipping shall first occur in the power amplifier.

J. The Paging system shall provide clear audio paging to all areas covered by the system.

2.03 PAGING SYSTEM

A. Modify the existing Rauland Telecenter ICS paging system as required to serve the new construction. Provide additional line cards, amplifiers, cabling, connections, etc. as required for a complete and operable system.

B. LOUDSPEAKERS:

1. Classroom/Office speakers – Rauland.

2. Classroom Speaker back box – Lowell P68X with Lowell SG-8VP 8" grill with tamper resistant screws. Back box to be flush mounted in wall next to clock.

3. Main Speaker Feed – Paige 452215PSB 15 pair shielded #22 AWG cable.

4. Classroom Speaker Wire – West Penn AQC355.

5. Hallway speakers – Rauland ceiling speaker enclosure, Rauland TB8 tile bridge, Rualand speaker.

6. Exterior Speakers – Electro-Voice CFID32T.

7. Provide and install recessed AC outlet for clocks.

8. All classroom/office/hallway speakers to be individually wired to a single port on ICS system.

9. Classroom speakers to be tapped at 1/2 watt, hallway 1/8 watt, offices 1/8 watt.

10. Tap exterior speakers per District instructions.

11. All bathroom speakers to be on separate zones/circuits. Do not combine with speakers in different buildings.

12. All outside speakers on separate zones/circuits. Do not combine with indoor or outdoor speakers.

13. Punch jacks shall be 66M50 punch blocks with 89D brackets.

14. Provide all necessary mounting hardware.

15. All loudspeakers are to be adjusted to have the same sound pressure level (SPL), plus or minus two db at four feet above the floor regardless the mounting height.

PART 3 – EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. The wiring of the system shall be executed in accordance with the drawings and the equipment manufacturer's wiring diagrams. Should any variations in these requirements occur, the contractor shall notify the architect before making any changes. It shall be the responsibility of the factory-authorized distributor of the approved equipment to install the equipment and guarantee the system to operate as per plans and specifications.

B. Furnish all conduits, junction boxes, conductors, equipment plugs, terminal strips, etc., and labor to install a complete and operable system.

C. The cables within the rack or cabinets shall be carefully cabled and laced with Velcro wraps. All cables shall be numbered for identification.

D. Splices of conductors in underground pull boxes are not permitted.

E. The labor employed by the contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the owner and architect to engage in the installation and service of this system.

F. The contractor shall thoroughly clean all equipment and materials. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc., The contractor shall remove all debris and rubbish occasioned by the electronic systems work from the site. The contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., Caused by the performance of this work.

G. The system must meet all local and other prevailing codes.

H. All cabling installations shall be performed by qualified technicians.

I. All cabling shall be splice free.

J. In order to ensure the least amount of cable untwisting, it is required that all cables shall be stripped using a special tool.

K. The use of lubricants (i.e. Yellow 77) to facilitate the installation of cables in conduits is highly discouraged. If such a lubricant must be used, the contractor shall verify the acceptability of the lubricant to be used with the cable manufacturer, prior to using such a lubricant.

L. Under no circumstance are "channel locks" or other pliers to be used.

M. Plenum rated cable may be run exposed above ceilings, provided the cabling is supported independent of other utilities such as conduits, pipes, and the ceiling support systems. The cables shall not be laid directly on the ceiling panels. The use of cable ties shall be done in accordance with the cable manufacturer's requirements. The cable jacket composition must meet local and all other prevailing fire and safety codes.

N. All firewalls penetrated by structured cabling shall be sealed by use a non-permanent fire blanket or other method in compliance with the current edition of National Fire Protection Association (NFPA) and the California Electric Code (CEC) or other prevailing code. The contractor must not use concrete or other non-removable substance for fire stopping on cable trays, wireways or conduits. Contractors who use this method will be required to replace all cables affected and provide the original specified access to each effected area.

O. All equipment racks shall be bolted to the floor by the contractor once the Owner determines the exact location for each rack. The earthquake mounting brackets that come with each relay rack kit shall be screwed to studs, not drywall. All equipment shall be serviceable in the racks final location – the need to unbolt racking equipment to access or service equipment is not acceptable.

3.02 SPECIFIC SYSTEM INSTALLATION REQUIREMENTS

A. The installer shall, upon completion of the system, orient all antennas, adjust all controls, etc., to provide a system operating at maximum capability.

B. Submit block diagram and shop drawing of equipment.

3.03 GENERAL TESTING REQUIREMENTS

A. Provide all instruments for testing and demonstrating in the presence of the owner's inspector that the frequency

response is as stated in the factory data sheets. Check all circuits and wiring to verify they are free of shorts and grounds.

3.04 SPECIFIC SYSTEM TESTING REQUIREMENTS

A. Provide a Techron TEF 20 and all other instruments to use during testing and adjusting of the system. Perform the following tests and include reports in the Owner's Manual:

1. Time align and balance the system.

2. Raw house frequency response.

3. On-axis frequency response after equalization.

4. Maximum program material sound level and head room.

5. Maximum system gain.

6. Hum and noise signal-to-noise of the overall system for each mike input channel.

7. Adjust system gain controls for optimum S/N ratio so that full amplifier output will be achieved with 0dBm at a line-level input.

8. Correct polarity of speakers and microphones.

9. Distortion shall be less than 5% THD.

10. Loss of articulation on consonances shall be less than 15%.

PART 4 – FINAL ACCEPTANCE

4.01 FINAL ACCEPTANCE

A. The Owner or Owner's representative may visit the site during the installation of the system to ensure that correct installation practices are being followed.

B. The Owner or Owner's representative will conduct a final job review once the contractor has finished the job. This review will take place within one week after the contractor notifies the owner.

C. Two copies of all certification data and drawings for all identifications shall be provided to the Owner before the owner's review.

D. The Owner or Owner's representative will review the installation and certification data prior to the system acceptance.

E. The Owner or Owner's representative may test some of the systems features to ensure that the certification data is correct. If a substantial discrepancy is found, the Owner reserves the right to have an independent consultant perform a certification of the entire system. If such a procedure is undertaken, the cost of the testing will be billed back to the contractor.

F. In the event that repairs or adjustments are necessary, the contractor shall make these repairs at his own expense. All repairs shall be completed within 10 days from the time they are discovered.

G. The contractor shall provide not less than eight (8) hours for site instruction of personnel in the operation and maintenance of the installed systems. This instruction time shall be divided as directed by the Owner.

H. The contractor shall hand to the owner a copy of any applicable installation specific software configurations in CD format.

END OF SECTION

SECTION 28 16 00
INTRUSION DETECTION SYSTEM

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. The Contractor shall furnish and install a complete expansion of the existing 12VDC intrusion detection system and integrate the system into the existing District Wide Intrusion Detection Network. The Intrusion Detection system shall be microprocessor-based, network capable and complete with an integral DACT and a Network Interface Card. The intrusion detection system shall be capable of providing, at a minimum, the following:

1. Intrusion Detection Control Panel

   a. Integral Digital Alarm Communications Transmitter (DACT).

   b. Network Interface capability via the District Wide Area Network.

2. Addressable initiation devices

3. Addressable control modules

4. Notification Appliances

5. Remote Power Supplies

6. On-site or remote video monitoring

7. Temperature threshold detection and monitoring

8. Humidity threshold detection and monitoring

9. Pressure threshold detection and monitoring

10. Power loss detection and monitoring, generator switching

11. Leak detection and monitoring

12. Carbon monoxide detection and monitoring Tank level threshold detection and monitoring.

13. Integral Card Access Control System

B. The Contractor shall furnish all labor, materials, appliances, tools, equipment, facilities transportation and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete as shown on

the applicable Contract Drawings and/or specified herein.

1. This specification document provides the requirements for the installation, programming, and configuration of a complete Command Processor Panel. This system shall include, but not be limited to:

    a. Control panel

    b. System cabinet

    c. Power supply

    d. Single and multi-zone expansion modules

    e. Addressable initiating bus (LX Bus)

    f. Keypad Bus

    g. Hard-wired zone cabling

    h. Batteries

    i. Conduit

        1) All required conduit and/or raceway shall be provided by the electrical contractor

    j. Associated peripheral devices

    k. Other relevant components and accessories required to furnish and install a complete and operational system.

C. Any material and/or equipment necessary for the proper operation of the system, which is not specified or described herein, shall be deemed part of this Specification.

D. The Addressable Intrusion Detection System specified herein shall be connected to the existing District Wide Intrusion Detection Network and Security Management Software.

1. The installing contractor shall be the Factory Authorized Distributor of both the Intrusion Detection System and the Security Management Software. Submittals provided by any contractor who is not so qualified shall be rejected.

2. Contractor shall coordinate with the District or its representative to obtain one Category 5 or 6 data jack and one telephone line for monitoring and system management.

1.2 QUALIFICATIONS

A. Equipment

1. This specification is based on the equipment of the manufacturer whose equipment is compatible with the existing District Wide Intrusion Detection Network and Security Management Software. Due to this fact, the herein named manufacturer's equipment shall be considered the District Standard for Intrusion Detection. No substitutions shall be accepted.

2. The District Standard for Intrusion Detection Equipment the District is Digital Monitoring Products (DMP).

   a. Contact David Sharp, Southwest Regional Sales Manager at (800) 641-4282

3. All equipment shall conform to applicable codes and ordinances.

4. All equipment shall bear the label of a Nationally Recognized Testing Laboratory (NRTL) such as Intertek Testing Services NA, Inc. (ITSNA - formerly ETL) or Underwriters Laboratories Inc. (UL) and be listed by their re-examination service.

B. System Supplier/Installer

1. The system shall be provided and installed by the Manufacturer's Authorized Distributor who is trained and certified by the Manufacturer in the proper installation, programming, service and maintenance of the system.

   a. Upon demand, the bidding Prime Contractor shall provide the following qualification documentation for the System Supplier/Installer whether it be himself or his subcontractor regardless of tier. Failure to provide the documentation listed below upon demand by the District or its representative shall be cause for disqualification of the Prime Contractor's entire bid.

      1) The System Supplier/Installer shall provide proof of current status as the Manufacturer's Authorized Distributor in good standing.

      2) The System Supplier/Installer shall provide proof that a minimum of four (4) technicians have attended and completed all requirements and received certification from the manufacturer's installation and service school.

      3) The System Supplier/Installer shall provide proof that

his company has been continuously engaged in the business of providing alarm systems on school projects in the Orange County area for a minimum of fifteen (15) years.

4) System Supplier/Installer shall provide a list of five (5) immediately verifiable Orange County School District references complete with names and telephone numbers.

5) System Supplier/Installer shall provide a list of twenty (20) on-going or completed projects of type indicated in the contract documents. Five of these shall be projects of similar size and scope to the project indicated in the bid documents and all must be immediately verifiable. For the purposes of this qualification, projects completed more than five years past shall not be acceptable.

6) The System Supplier/Installer shall hold a valid State of California Contractor's License, C-10.

7) The System Supplier/Installer shall hold a valid State of California Alarm Company Operator License, ACO.

8) The System Supplier/Installer shall provide proof that they maintain a complete service and maintenance center within 15 miles of the project address. A complete service center shall include replacement parts in stock in the quantities deemed sufficient by the district or its representatives.

2. The System Supplier/Installer shall be prepared to offer a service contract for the maintenance of the system beyond the warranty period.

1.3 RELATED SPECIFICATIONS

A. The conditions of the General Contract (General, Supplementary, and other Conditions) and the Division 1 - General Requirements specifications are hereby made a part of this Section.

1. All pertinent sections of Division 28, "Electronic Safety & Security"

B. RELATED WORK BY OTHERS

1. Reference Part 3, sub-section 3.01 of this specification.

1.4 APPLICABLE CODES & STANDARDS

A. Building Standards Administrative Code, Part 1, Title 24, California Code of Regulations

B. California Building Code (CBC) Part 2, Title 24, California Code of Regulations (International Building Code, Volumes 1 - 2 & California Amendments)

C. California Electrical Code (CEC) Part 3, Title 24, California Code of Regulations (National Electrical Code with California Amendments)

D. California Fire Code (CFC) Part 9, Title 24, California Code of Regulations (International Fire Code with California Amendments)

E. NFPA Standards

1. The intrusion detection system shall comply with the applicable provisions of the following current National Fire Protection Association (NFPA) standards:

a. NFPA 110, Standard for Emergency and Standby Power Systems

b. NFPA 111, Standard on Stored Electrical Energy Emergency and Standby Power Systems

c. NFPA 780, Standard for the Installation of Lightning Protection Systems

F. ADA - Americans with Disabilities Act

G. CAC – California Administrative Code, Title 24

H. U.L. Standards: The system shall comply with the applicable provisions of the following U.L. Standards:

1. UL 294, Standard for Access Control Systems Units

2. UL 609, Standard for Local Burglar Alarm Units and Systems

3. UL 634, Standard for Connectors and Switches for Use with Burglar-Alarm Systems

4. UL 636, Standard for Holdup Alarm Units and Systems

5. UL 639 Standard for Safety for Intrusion-Detection Units

6. UL 681, Standard for the Installation and Classification of Burglar and

Holdup Alarm systems

7. UL 1076, Standard for Proprietary Burglar Alarm Units and Systems

8. UL 1610, Standard for Central Station Burglar Alarm Units

9. UL 1635, Standard for Digital Alarm Communicator System Units

10. UL 2044, Standard for Commercial Closed Circuit Television Equipment

1.5 SUBSTITUTIONS: No substitutions shall be accepted.

1.6 SUBMITTALS

A. Within thirty-five (35) calendar days after the date of the award of the contract, the Contractor shall submit to the Architect for review, eight (8) copies of a complete Submittal Package. The Submittal Package shall consist of the following sections, with each section separated with index tabs.

1. Title Page

   a. Project Title

   b. Project address

   c. Architect's name and address

   d. Contractor's name and address.

2. Index of Submittal Contents: Each Section of the Submittal Package shall be numbered chronologically and shall be summarized in the Index.

3. Certifications

   a. Index of Certification Section Contents

   b. Valid State of California Contractors License

   c. Manufacturer's Certifications

      1) Authorized Distributor

      2) Factory Trained Technician

4. Project List

   a. A substantial list (minimum of 20) of completed projects equal in scope to that specified herein.

1) Contact information shall be made available upon request.

5. Product Data

a. Index of Equipment Data Sheets

b. Manufacturer's Data Sheets including cable types

c. Applicable Listings and Approvals

PART 2 – PRODUCTS

2.1 SYSTEM REQUIREMENTS

A. Component Enclosure: Housings; power supply enclosures, terminal cabinets, control units, and other component housings, collectively referred to as enclosures shall be so formed and assembled as to be sturdy and rigid. If sheet steel is used in the fabrication of enclosures, it shall be not less than an 18 gauge door with a 20 gauge box frame. Where exposed pins, the hinges shall be of the tight pin type or the ends of hinge pins shall be tack welded to prevent ready removal. Doors having a latch edge length of less than 24 inches shall be provided with a single lock. Where the hinged door latch edge is 24 inches or more in length, doors shall be provided with three-point latching device with lock; or alternatively with two locks, one located near each end. For SCIF and High Security applications an attack proof enclosure with proper tampers UL listed for use with the XR500/XR500N/XR500E shall be used.

B. Electronic Components

1. All system electronic components shall be solid-state type, mounted on printed circuit boards. Light duty relays and similar switching devices shall be solid-state type or electromechanical.

2. The panel shall have an over-current notification LED that lights when devices connected to the Keypad Bus and LX-Bus(es) draw more current than for which the panel is rated. When the over-current LED lights, the LX-Bus (es) and Keypad bus are shut down.

C. Control Unit

1. The networked control panel shall provide the following capabilities:

a. Expansion to a total of at least 10,000 user codes with 99 user profile definitions.

b. Sixteen (16) independent door/keypad addresses, each with four zones.

c. Twenty (20) Holiday Dates for custom holiday scheduling by

area.

d. A total door access granted event buffer of at least 10,000 events.

e. Anti-passback access control selectable by area and user.

f. Four (4) shift schedules per area.

g. A total of at least 100 programmable output relay schedules.

h. Thirty-two (32) individual reporting areas.

i. Built-in bell and telephone line supervision.

j. Require two-man access code or credentials.

k. Support programming to require the same or different access code entered within a programmed delay time of 1 to 15 minutes after disarming before activating a silent ambush alarm.

l. Support area programming that disables schedule and time-of-day changes while system is armed so that area can only be disarmed during scheduled times.

2. Control unit shall be capable of operating and supervising notification appliance devices as well as addressable initiating detection devices and an integrated supervised dual line digital communicator.

3. Control unit must be "Flash ROM" updatable, and program must be held in non-volatile RAM. The panel shall be able to function while the update is in process.

4. Control unit shall be capable of sending information to and receiving instructions from the existing District Wide Security Management Software via the District's Wide Area Network (WAN).

5. Control unit shall be capable of operating using an optional built in Encrypted Alarm Router for SCIF (Sensitive Compartmented Information Facility) applications that is certified by NIST (National Institute of Standards and Technology) for 128 Bit AES Rijndael Encryption communications.

6. The optional built-in Encrypted Alarm Router shall be capable of compliance with DCID 6/9 and UL 2050 standards.

D. Control Designations: Controls shall be provided to ensure ease of operation of all specified characteristics. Where applicable, clockwise rotation of controls shall result in an increasing function. Controls, switches, visual

signals and indicating devices, input and output connectors, terminals and test points shall be clearly marked or labeled on the hardware to permit quick identification of intended use and location.

E. Test Modes

1. The system shall include a provision that permits testing from any alphanumeric keypad. The test shall include standby battery, alarm bell or siren, and communication to the District Police Station.

2. The system shall include a provision for an automatic, daily, weekly, thirty (30) day, or up to sixty

(60) day communication link test from the control panel installation site to the central station.

3. The system shall include a provision for displaying the internal system power and wiring conditions. Internal monitors shall include the bell circuit, AC power, battery voltage level, charging voltage, panel box tamper, phone trouble line 1, phone trouble line 2, transmit trouble, and network trouble.

F. Serial Interface: The control panel shall be capable of a serial interface to output information to a standard serial printer or serial interface to a communication port on a standard computer. Through control panel programming the system shall include a provision to allow the selection of which reports are to be output.

G. Power Supplies

1. Power supplies for the control unit shall operate from 120 VAC, supplied at the respective protected areas. Standby batteries shall be supplied to power the system in the event of a utility power failure. Batteries shall be sized to provide 105% capacity for eight hours. Standby batteries shall be sealed lead-acid. Power supplies shall be all Solid State.

2. Controls shall be designed to maintain full battery charge when alternating current is available. Batteries shall be recharged to 85% capacity within 24 hours from battery use. The system shall be automatically transferred to battery power upon loss of alternating current power and return to alternating current power upon restoration. Intrusion alarms shall not be initiated during switch over; a signal shall be initiated upon failure of battery or alternating current power.

3. Approved power supplies shall meet or exceed the following power supply model specifications:

a. UL Listed DMP 505-12: 12VDC 5 amp with transformer and enclosure.

b. UL Listed DMP 504-24: 24 VDC 4 amps with transformer and enclosure.

H. Software

1. The system shall have the capability to interface with computer software with the capability to fully program the panel by connecting to the panel through:

   a. Direct cable connection interface card

   b. Receiver phone line connection

   c. Standard phone line connection

   d. Ethernet network connection

   e. Network connection across the Internet

2. The system shall interface with the existing District Wide Security Management Software via the District Wide Area Network (WAN).

3. The system shall interface with computer software capable of exporting reports in the following file formats:

   a. Excel spreadsheet (*.xls)

   b. Rich Text (*.rtf)

   c. Windows Metafile (*.wmf)

   d. QuickReport (*.qrp)

   e. Text (*.txt)

   f. Comma-separated (*.csv)

   g. HTML document (*.htm)

4. The system shall interface with computer software capable of printing custom, filtered reports including:

   a. All Events

   b. Zone Action

   c. Arming/Disarming

   d. Area Late to Close

   e. User Code Changes

f. Door Access Granted

g. Door Access Denied

h. Opening/Closing Schedule Changes

i. System Monitors

j. System Events

I. FALSE ALARM REDUCTION FEATURES

1. The system shall be capable of providing false alarm reduction features, functions, capabilities, or processes that either require alarms be verified or potential alarms be corrected before a system or zone can be placed into an armed state.

2. Exit Error Alert and Reporting: The panel shall be able to provide an automatic function to prevent a false alarm from occurring if an exit door does not properly close after the system is armed.

3. Entry and Exit Delay Annunciation

   a. When arming, the system shall provide clear annunciation indicators to the user about the need to exit the premises prior to the exit delay time expiring.

   b. When disarming, the system shall notify the user the need to disarm the system prior to the entry delay time expiring.

4. Remote Annunciation: The system shall be able to provide entry and exit delay time period notification. This notification can be from DMP keypads, remote annunciators, or bell tests.

5. Abort Reporting: The system shall be capable of sending an Abort report to the central station if the system is disarmed while the alarm is still sounding. The Abort report shall be sent after the alarm report to notify the central station that an authorized user has cancelled the alarm.

6. System Testing: The system shall offer testing features that are simple, quick, and complete and provide the highest measure of safety by ensuring that alarm conditions are detected and communicated to the proper authorities in a timely manner and on a regularly scheduled basis.

7. Ambush Code: The system shall offer ambush codes for those dangerous encounters where the user is instructed to either arm or disarm the system under threat of harm. The duress code shall disarm the system without giving local indication of an alarm that might put the user well-being in jeopardy.

8. Two-Button Panic Feature: The system shall support DMP keypads that provide the option to use only two-button panic codes. The user shall be required to press and hold two designated keys for approximately two seconds before the system generates a panic alarm.

9. Fire Verify Zones: The system shall support Fire Verify zones to help the panel verify the existence of an actual fire condition before it sends an alarm report to the central station. The Fire Verify zone shall require the panel to perform a Sensor Reset whenever a device connected to a Fire Verify zone initiates an alarm. This shall begin a verification period during which the panel waits for a second alarm initiation. If the original zone or any other Fire Verify zone on the panel initiates an alarm within the next 120 seconds, the panel shall recognize this as an actual alarm and send an alarm report to the central station.

10. Cross-Zoning Protection: The system shall support cross-zoning as a means of requiring two device trips to occur within a short period of time before sounding an alarm and sending an alarm report to the central station. Supported device trips shall be from one device that trips two times, or from two devices that each trip once.

11. Swinger Zone Bypassing: The system shall be capable of automatically bypassing a zone if it goes into an alarm or trouble condition a specified number of times within a one-hour period. The panel shall be able to track the number of times the zone trips while armed and compare that against a programmed number. When that number is reached, the panel shall be able to automatically bypass the zone. The panel shall be capable of resetting the zone when the area to which it is assigned disarms, is manually reset from the keypad or remotely, or remains normal for one hour.

12. Recently Armed Report: The system shall be capable sending a System Recently Armed report, along with a zone alarm report, to the central station any time an alarm occurs within five minutes of the system arming. The System Recently Armed report allows the central station operator to follow a "call the subscriber first" procedure instead of immediately dispatching the police to what could be a false alarm.

13. Transmit Delay: The system shall be capable of programming the panel to wait up to 60 seconds before sending burglary alarm reports to the central station. If an alarm is accidental, the user shall be able to disarm the system within the programmed Transmit Delay time. An Abort report shall be sent in place of an alarm report after the system disarms. During the alarm, sirens and panel relay outputs shall not be delayed and shall still provide local condition annunciation.

14. Call Waiting Cancel: The system shall be capable of being programmed to cancel call waiting any time the panel dials the

receiver number to send a report.

2.2 SYSTEM CAPABILITIES

A. System Description

1. The system user shall be capable of selectively arming and disarming any one or more of 32 areas within the intrusion detection system based on the user PIN code and/or keypad used. Each of the 574 zones shall be able to be assigned to any of the 32 available areas. The system shall be capable of having up to a sixteen (16) character length name programmed for each area.

2. The system user shall be capable of assigning an opening and closing schedule to all areas or to each of the 32 areas separately. Each area shall be able to arm or disarm automatically by a schedule. The system shall have the capacity for common areas that automatically disarm when any other area disarms and that automatically arm when all others areas arm.

3. The networked system shall have the ability to comply with Bank Safe & Vault application. The networked system shall also have the ability to use a two-man rule for disarming or allowing door access to an area. The system shall have the ability to operate a Common Area application.

4. The system shall have a minimum of eight (8) grounded burglary zones available from the control panel.

5. The system areas and zones shall be programmable, and the system shall store, log, display, and transmit specific custom designations for system areas, zones, and user names.

6. To ensure continued, one-call support, the system shall be constructed of sensing components provided directly by the system manufacturer, such as power supplies, motion detectors, door and window position switches, glass break detectors, or other sensing devices that the manufacturer offers.

7. The system controller, user interfaces, zone input devices, relay output devices, and the system signal receiving equipment shall be engineered, manufactured, assembled, and must be distributed from a location within the United States of America.

8. The system shall support user interaction by way of a keypad, web browser, system software, key switch, or radio frequency wireless control, using integrated or auxiliary devices provided by the system manufacturer.

9. The system shall support controller zone input connections, system keypads, system zone expansion modules, and wireless zone input modules, and must support zone input connections by way of at least

two competitive products. The system shall offer a seamless integrated compatibility with hard-wire and/ or wireless zone expansion equipment for at least 200 wireless zones and/ or a maximum of 574 hardwired zones.

10. The system shall be capable of offering at least five zone expansion buses, each of which can support the connection of up to 15,000 feet of four-wire cable. Zone expansion and keypad data buses that exceed 2,500 feet of cable must include splitter/repeater modules to boost data voltage and maintain data integrity.

11. The system shall provide a seamless capability to provide a minimum of 500 addressable relays, which can be located at any connection location upon a zone expansion bus.

12. System relay outputs shall have the capability of being triggered as a result of a command from the user interface, changes in system status, changes in zone status, or by a programmable schedule.

13. System relay output states shall be programmable for momentary, maintained, pulsed, or must follow the state of an associated system zone input.

14. The system shall be completely programmable either locally from a keypad or remotely through a standard dial-up, and network connections by way of a LAN, WAN, and/or by way of the Internet.

15. The control unit shall be completely programmable remotely using remote annunciators, and/ or using upload/ download software that communicates using SDLC 300 baud, 2400 baud, or IP Addressed data network. On-site programming from a personal computer shall also be permitted.

16. The control unit shall be equipped with an anti-reversing circuit breaker to prevent damage due to accidental reversal of battery leads.

B. Input/Output Capacity

1. This system shall be capable of monitoring a maximum of 574 individual zones and controlling a maximum of 502 output relays.

2. The control panel shall have, as an integral part of the assembly, 2 SPDT Form C relays rated at 1 Amp at 30 VDC and four open collector 12 VDC outputs rated at 50mA each. It shall also have the capacity of a maximum of 125 output expander modules with 500 switched ground, open collector outputs, 50mA maximum and 502 auxiliary relays (Form C rated at 1.0 Amp at 30 VDC).

3. The panel shall also provide 100 programmable output schedules, and include an integral bell alarm circuit providing at least 1.5 Amps of steady, pulsed, or temporal bell output. Output type shall be

programmable by zone type. Relays and voltage outputs shall be capable of being independently programmed to turn on and/or off at selected times each day.

C. User/Authorization Level Capacity: The system shall be capable of operation by 10,000 unique Personal Identification Number (PIN) codes with each code having one (1) of ninety-nine (99) custom user profiles. This allows for limitation of certain functions to authorized users. The operation of all keypads shall be limited to authorized users.

D. Keypads

1. The system shall support a maximum of sixteen (16) keypads with alphanumeric display. Each keypad shall be capable of arming and disarming any system area based on a pass code or Proximity key authorization. The keypad alphanumeric display shall provide complete prompt messages during all stages of operation and system programming and display all relevant operating and test data.

2. Communication between the control panel and all keypads and zone expanders shall be multiplexed over a non-shielded multi-conductor cable, as recommended by the manufacturer. This cable shall also provide the power to all keypads, zone expanders, output expanders, and other power consuming detection devices.

3. If at any time a keypad does not detect polling, the alphanumeric display shall indicate "SYSTEM TROUBLE". If at any time two devices are programmed for the same address, the alphanumeric keypad shall display “4 WIRE BUS TROUBLE”. If at any time a keypad detects polling but not for its particular address, the alphanumeric display shall indicate "NON POLLED ADDR". The system shall display all system troubles at selected keypads with distinct alphanumeric messages.

4. The keypad shall include self-test diagnostics enabling the installer to test all keypad functions: display test, key test, zone test, LED test, relay test, tone test, and address test.

5. The keypad shall provide an easy-to-read English text display. The text shall exactly match the text seen in all software reports, keypad displays, and central station reports.

6. The keypad user interface shall be a simple-to-use, menu-driven help system that is completely user friendly.

7. The control panel shall support a keypad interface accessible on the World Wide Web in a browser window. The web-accessible keypad interface shall provide at least five (5) programmable hyperlinks for camera access or other use.

8. The system shall support sub-control keypads with four (4) built-in

zones and capable of functioning in the following modes:

a. Panel monitors all four (4) keypad zones independently with a maximum of 125 keypads attached to the control panel.

b. Panel assigns one (1) zone to each keypad and monitors all keypad zones as a single zone with a maximum of 500 keypads attached to the control panel.

c. Stand-alone mode allowing keypad to operate as a self-contained security system independent of the control panel

E. Zone Configuration

1. A minimum of 4 Class B ungrounded zones shall be available at each keypad or zone expander on the system. The system shall have the capacity for a maximum of sixteen (16) keypads and a maximum of 125 four (4) zone expanders or 500 single zone expanders. It shall also have the capacity of a maximum of 125 supervised relay output expanders.

2. Each zone shall function in any of the following configurations: Night, Day, Exit, Fire, Supervisory, Emergency, Panic, Auxiliary 1, Auxiliary 2, Fire Verification, Cross Zone, Priority, and Key Switch Arming.

3. The LX bus and the keypad bus shall be able to operate at a maximum wiring distance of 2500 feet from the control panel on unshielded, non-twisted cable. This distance may be extended to a total of 15,000 feet when bus splitter/repeater modules are installed.

4. The system shall have the capability to incorporate up to 500 addressable zone expander points.

5. Each zone shall function in any of the following configurations:

a. Night

b. Day

c. Exit

d. Fire

e. Supervisory

f. Emergency

g. Panic

h. Auxiliary 1

i. Auxiliary 2

j. Fire Verification

k. Cross-Zone

l. Priority

m. Arming

F. Communication

1. The system shall be capable of signaling to two remote monitoring station receivers, four telephone numbers of 32 digits each using two separate switched telephone network lines such that if two unsuccessful attempts are made on the first line to the first number, the system shall make two attempts on first line to the second number. If these two attempts are unsuccessful, the system shall make two further attempts on the first line of the first number. After the tenth unsuccessful attempt, dialing shall stop and the alphanumeric keypad shall display trouble. Should another event occur that requires a report to be transmitted, the dialing process shall be repeated. The system shall have a programmable option to dial a second set of telephone numbers after the first ten attempts using the same s equence.

2. The system shall be capable of communication using the IBM Synchronous Data Link Control format, and at least two other standard industry formats.

3. The system shall be capable of supporting Network communication with digital dialer backup, existing Ethernet or token ring data networks, satellite communication, fiber optic networks, local area networks, wide area networks, cellular communication, and retail data networks.

G. Network Communication

1. The control panel shall be capable of asynchronous network communication with a retry time between 3 and 15 seconds for a total of one (1) minute. If communication is unsuccessful the control panel shall be capable of attempting backup communication through any of the available communication methods to the same receiver or a backup receiver.

2. Network communication between the control panel and the receiver shall be in a proprietary communication format.

3. The control panel shall be capable of supporting Dynamic Host Communication Protocol (DHCP) Internet Protocol (IP) addressing.

4. Underwriters Laboratories (UL) shall list network communication by the control panel for Grade AA High-Line Security.

5. The control panel shall be capable of two-way network communication using standard Ethernet 10BaseT in a LAN, WAN, or Internet configuration.

6. The control panel shall be capable of communication by means of a 128 Bit AES Rijndael Encryption process certified by NIST (National Institute of Standards and Technology) to an SCS- 1R receiver with a built-in Encryption Alarm Router.

7. The control panel shall be capable of meeting DCID 6/9 and UL 2050 standards.

H. TCP/IP Network Trapping

1. The control panel shall be capable of having communication set to Network operation. When a trap is set in Remote Link, the software shall be capable of sending a panel trap message with the panel account number to the iCOM or iCOM-E installed in an SCS-1R receiver.

2. The receiver iCOM or iCOM-E shall store the trap and monitor the panel for the next message. When the panel sends its next message, the receiver iCOM or iCOM-E shall then send a message to the panel to contact Remote Link at the IP address contained in the original trap message.

3. The trap message shall be stored in the receiver iCOM or iCOM-E for up to four hours. If the trap message is not sent to the panel within the four-hour window, the panel trap message shall be discarded and a new trap message must be sent from Remote Link.

4. The user shall be able to view the trap status in the receiver iCOM or iCOM-E in Remote Link using the Trap Query function.

I. NAC Circuit Configuration

1. The system shall be capable of additional Class B NAC circuits utilizing the Model 867 Notification Module. Each module shall be controlled and supervised via the SLC loop and monitor for short circuits, open circuits, and ground faults. The NAC circuits shall monitor for external NAC trouble conditions.

2. The system shall be capable of providing Class A NAC circuits utilizing the Model 865 Notification Module. Each module shall monitor for short circuits, open circuits, and ground faults. The NAC circuits shall monitor for external NAC trouble conditions and have a manual bell silence switch.

2.3 SYSTEM COMPONENTS

A. Head End Equipment (Existing Head End Equipment)

1. Intrusion Alarm Control Panel: DMP - Model No. XR500N-G

   a. Complete with large enclosure

   b. Complete with Dialer

   c. Quantity of (1) one required.

2. Zone Expansion Interface Card: DMP - Model No. 481, Quantity of (1) one required.

3. Expansion Bus Adaptor: DMP - Model No. 461, Quantity of (1) per 100 points, Maximum of (5) five per Control Panel, Provide a minimum of (2) for this project

B. Remote Power Supplies: Altronix – Model No. SMP3 -- Power supply for passive infrared detectors, 12VDC provide one in each building. Provide power supply, terminal cabinet, transformer and battery as required for a complete and operable system. (Provide additional power supplies as required).

1. Terminal cabinet enclosure: Mier Products, Inc. – Model No. MIPW108 or equal

2. Transformer 120VAC-12VDC: DMP - Model No. 321

3. Battery: Yuasa – Model No. NP7-12 or equal

C. Data Bus Splitter/Repeater: DMP – Model No. 710. Expands the typical LX-Bus installation number of devices and the length of the wire. (Provide as required)

D. Single Point Zone Expander: DMP - Model No. 711 – Single Point Zone Expander. The single point zone expander module provides a single addressable point and serves as the interface between the 4-wire LX Bus from the control panel and the conventional initiation devices (i.e. motion sensors and door switches). Maximum of 574 addressable zones are available on the XR500N-G type control panel. (Provide as required)

E. Multi-Point Zone Expander:

1. DMP – Model No. 714-8 - Eight-point Zone Expander. The eight-point zone expander module provides eight addressable points and serves as the interface between the 4-wire LX Bus from the control panel and the conventional initiation devices (i.e. motion sensors and door switches). Maximum of 574 addressable zones are available on the XR500N-G type control panel. (Provide as required)

F. Motion Sensors – Dual Technology

1. Bosch – Model No. DS9360

a. Ceiling mount (PIR) passive infrared/microwave motion sensor

b. 360 degree X 60′ diameter pattern

c. Locate motion sensors for optimum coverage per manufacturer's recommendation.

d. Connect to LX Bus via zone expansion module

2. Bosch – Model No. DS950

a. Surface wall mount (PIR) passive infrared/microwave motion sensor

b. 50′ x 50′ range

c. Locate motion sensors for optimum coverage per manufacturer's recommendation.

d. Connect to LX Bus via zone expansion module

G. Wire/Cable

1. Interior Device Cable: Falcon Wire - Model No. 590422R or equal. 22/4-conductor stranded CMR with white jacket

2. Underground LX Bus/Keypad Bus Cable: Falcon Wire - Model No. 400418H20 or equal. 18/4- conductor stranded FPL with black jacket. Water-blocked cable construction

PART 3- EXECUTION

3.1 DIVISION OF WORK

A. While all work included under this specification is the complete responsibility of the contractor, the division of actual work listed following shall occur.

1. All conduits with pull cords, all electrical pull boxes, grounding rods, all outlet boxes, terminal cabinets, backboards, etc., which form part of the rough-in work shall be provided and installed completely by the Division 26 Contractor. Coordinate as necessary for proper installation.

2. The balance of the system, including installation of initiating devices, notification appliances and equipment, making all connections, etc., shall be performed by the Factory Trained Technicians of the System Supplier/Installer.

3. All 120VAC power conductors and conduits associated with power circuits to all low voltage system equipment locations shall be provided and installed by the Division 26 Contractor.

4. System grounding, in compliance with CEC Article 250, by the Division 26 Contractor.

5. Labeling of pullboxes and terminal cabinets shall be provided and installed by the Division 26 Contractor.

3.2 INSTALLATION

A. All work shall be completed in strict accordance with all applicable codes and ordinances, by a qualified Manufacturer's Authorized Distributor.

B. Cable/Wire

1. All cable/wire for the system specified herein shall be new, unless otherwise noted on plans.

2. System cable/wire and equipment installation shall be in accordance with good engineering practices as established by the California Electrical Code (CEC). Wiring shall meet all applicable electrical codes. All cable/wire shall test free from all grounds and shorts.

3. All cable/wire shall be labeled at all points of termination. All labeling shall be based on the room numbers as provided by the District or its representative.

4. Protection and dressing of cables: Cables mounted on backboards and within equipment racks, etc., shall be grouped and securely attached to the backboard or enclosure in horizontal and vertical bundles in a neat workmanlike manner using Thomas & Betts "Ty-Rap", Panduit cable mounts and Allen-Tel cable management or equal. Edge protection material ("cat-track") shall be installed on edges of holes, lips of ducts or any other point where cables or harnesses cross metallic edge.

5. Shielding: Shielded cable shall not be utilized for this system. No exceptions.

6. Underground cables: Any cable/wire pulled through manholes or pullboxes located below grade, shall be continuous with no splices. The cable/wire shall be intact with no cuts in the protective outer jacket. The cable/wire shall be suitable for this application.

C. WIRE TERMINATING: All conductors shall be equipped with spade lugs at terminations in terminals, motion detection units and controllers. All splices shall terminate on terminal blocks and all wire shall be color coded, using colors consistent with use:

1. Door Switches:2-White

2. Fire Sprinkler: 2-Red

3. Security Switches: 2-Black

4. Alarm Common: White

5. Alarm Signal (Zone): Brown

6. Alarm Voltage: Pink

D. SYSTEM START-UP: All start-up programming and system commissioning shall be performed by a manufacturer's trained and certified technician.

E. SYSTEM VERIFICATION: Subsequent to system start-up the system installer shall perform a pre-test to verify that the following features are functioning properly.

1. All initiation devices

2. All monitor modules

3. Local audible devices

4. Network connection and communication link to monitoring service

F. ACCEPTANCE TESTING: The system installer shall, in the presence of the Inspector of Record (IOR), perform 100% testing as noted in System Verification above.

G. IN SERVICE TRAINING: The Contractor shall instruct personnel designated by the District in the proper use, basic care and maintenance of the system beyond the warranty period. Contractor shall provide up to four hours of in-service training with this system.

H. FACTORY TRAINING & CERTIFICATION

1. The manufacturer shall provide factory certified training to two (2) technicians from the District. These technicians shall be trained and certified as manufacturers certified technicians capable of performing any work on the system after the installation of the system.

2. All cost for training including travel, lodging, meals and per diem shall be included in the System Supplier/Installer's bid for this project.

I. CONTRACT CLOSE-OUT DOCUMENTATION: Contractor shall provide the following:

1. One reproducible hard copy of project record drawings.

2. One copy of manufacturer's maintenance and operation manuals.

3. One copy of system warranty

J. WARRANTY: The Contractor shall warrant the equipment to be new and free from defects in material and workmanship, and will, within one year from

the date of installation, repair or replace any equipment found to be defective. This warranty shall not apply to any equipment that has been subject to misuse, abuse, negligence or unauthorized modification.

END OF SECTION

SECTION 28 31 00
FIRE ALARM SYSTEM

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. The work under this section includes all final design, all labor, material, equipment, supplies, labor, testing, and accessories required to furnish and install a complete Fire Alarm System as indicated on the drawings and as specified herein.

B. All miscellaneous system components including, but not limited to, cables, termination equipment, punch blocks, patch panels, backboards, and any other related items shall be furnished and installed complete under this section, such that the system shall perform all functions listed herein in compliance with all of the specified requirements.

C. The Fire Alarm System shall include, but not limited to, the following subsystems / products:

1. The contractor shall furnish and install equipment and devices compatible with existing Silent Knight Farenhyt Series IFP-2100ECS 24VDC analog addressable network fire alarm system with System Sensor two-wire synchronized notification. The new Fire Alarm System shall be integrated with the existing Facility Wide Silent Knight Farenhyt Fire Alarm Network. The Fire Alarm Control Panel (FACP) or panels shall be microprocessor-based, network capable and complete with an integral Digital Alarm Communications Transmitter (DACT) that is UL listed for Remote Station, Proprietary and Central Station fire alarm systems. The FACP shall be compliant with UL 864, 9th edition.

a. The fire alarm system shall be furnished and installed by a Silent Knight Farenhyt Factory Elite Partner. Systems furnished and/or installed by contractors who are not Factory Elite Partners of Silent Knight Farenhyt products shall be considered in non-compliance with this specification and subject to replacement at the expense of the Prime Contractor.

1) The Silent Knight Farenhyt Factory Elite Partner shall furnish all labor, materials, appliances, cabling, tools, equipment, facilities, transportation and services necessary for and incidental to the performance of all operations in connection with furnishing, delivery and installation of all equipment, wiring, programming, configuration, testing and training required by this Section, complete as indicated in the applicable Contract Drawings and/or specified herein.

b. This specification provides the requirements for the installation, programming, configuration, testing and maintenance of a complete analog addressable fire alarm system. This system shall include, but shall not be limited to:

- Control panel
- System cabinet
- Power supply
- Network Interface Module
- Digital Signaling Line Circuits (SLC)
- Notification Appliance Circuits (NAC)
- RS-485 Serial Communication Bus (S-bus)
- Annunciators both integral and remote
- Batteries
- Wiring
- Conduit
- Associated peripheral devices
- Other relevant components and accessories required to furnish and install a complete and operational fully automatic, addressable reporting Life Safety System.

2. The fire alarm system shall be capable of providing, at a minimum, the following:

a. Fire Alarm Control Panel (FACP)

1) Integral Digital Alarm Communications Transmitter (DACT).

2) Network Interface capability via copper and/or fiber optic network.

b. Analog addressable initiation devices

c. Analog addressable monitor and/or control modules

d. Notification appliances

1) Compatible with combination horn/strobe two-wire synchronized circuit.

e. Notification Appliance Circuit (NAC) remote power supply

1) Combination horn/strobe two-wire circuit.

2) Built-in synchronization capabilities

f. Voice Evacuation capability

g. Firefighter Telephone capability

3. Any material and/or equipment necessary for the proper operation of the system, which is not specified or described herein, shall be deemed part of this Specification.

4. The Analog Addressable Fire Alarm System specified herein shall be connected to a UL Listed Central Station Monitoring Company.

    a. Contractor shall coordinate with the Owner or his representative to obtain two telephone lines for code required offsite monitoring.

5. Contractor shall offer code required fire alarm system inspection and maintenance contract.

D. All work shall be in compliance with CBC/CFC Chapter 9 and NFPA 72.

1.02 RELATED WORK

A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and sections of these specifications.

B. All applicable portions of Section 26 10 00 shall apply to this section as though written herein completely.

1.03 QUALIFICATIONS

A. Equipment

1. This specification is based on the equipment of manufacturer(s) who have been approved by the Owner and the Manufacturer(s) herein named shall be considered as meeting the requirements of this specification.

2. The equipment manufacturer shall be a United States manufacturer, who has been regularly engaged in the manufacture of fire alarm systems for at least twenty-five (25) years.

3. The existing Fire Alarm Control Panel is Silent Knight Farenhyt IFP-2000ECS.

    a. Equipment provided for this project shall be the product of Silent Knight Farenhyt by Honeywell. No substitutions shall be approved.

4. It is the Contractor's responsibility to meet the entire intent of these specifications. Deviations from the specified items shall be at the risk of the Contractor until the date of final acceptance by the Architect, Engineer and the Owner's representative. All costs for removal, relocation or replacement of a substituted item shall be at the risk of the Prime Contractor.

5. All equipment shall conform to currently adopt applicable codes and ordinances.

6. All equipment shall be California State Fire Marshal (CSFM) listed.

7. All equipment shall bear the label of a Nationally Recognized Testing Laboratory (NRTL) such as Intertek Testing Services NA, Inc. (ITSNA - formerly ETL) or Underwriters Laboratories Inc. (UL) and be listed by their re-examination service.

B. System Supplier/Installer

1. The system shall be furnished and installed by a Silent Knight Farenhyt Select Factory Elite Partner who is trained and certified by the Manufacturer in the proper installation, programming, configuration, testing, service and maintenance of the systems specified herein.

2. Subsequent to a successful bid and upon request of the Owner the System Supplier/Installer shall submit a qualification documentation package which shall include the following:

    a. Evidence of current status as a Silent Knight Farenhyt Factory Elite Partner.

    b. Certificates indicating that a minimum of four (4) technicians have attended and completed all requirements and received certification from the manufacturer's installation and service school.

    c. A list of twenty (20) completed projects of equal scope, with associated Owners Representative contact names and telephone numbers.

    d. Evidence of current State of California Contractor’s License, C-10.

    e. Evidence of current State of California Alarm Company Operator License, ACO.

    f. Per California law all individuals involved in the installation of the fire alarm system shall hold a valid State of California, Division of Apprenticeship Standards (DAS), Fire/Life Safety Technician Certification.

        1) Evidence of DAS certification shall be provided immediately upon request at the project site.

    g. The System Supplier/Installer shall show satisfactory evidence, upon request, that he maintains a fully equipped service organization capable of furnishing adequate inspection, service and maintenance of the system.

h. The System Supplier/Installer shall maintain at his facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.

i. The System Supplier/Installer shall be prepared to offer a service contract for the maintenance of the system beyond the warranty period.

j. The System Supplier/Installer shall provide proof that they maintain a complete service and maintenance center within 50 miles of the project address. A complete service center shall include replacement parts in stock in the quantities deemed sufficient by the owner or its representatives.

1.04 QUALITY ASSURANCE

A. In order to maintain a high degree of quality assurance, the contractor shall, without exception, use the parts and supplies as specified in this specification.

B. The equipment shall be as manufactured by Silent Knight Farenhyt.

1.05 SUBMITTAL AND MANUAL

A. Comply with all requirements of the General Conditions, Supplementary Conditions and applicable sections of Divisions 1 and 16 of these specifications.

B. Additional requirements of this section are:

1. Within thirty-five (35) calendar days after the date of award of the Contract, the Contractor shall submit eight copies of the complete submission to the Architect for review.

2. The submission shall consist of five major sections with each section separated with index tabs. Each page in the submission shall be numbered chronologically and shall be summarized in the index.

3. The first section shall be the "index" which shall include the project title and address, name of the firm submitting the proposal and name of the Architect.

4. The second section shall include the following items:

a. Contractor’s License: A copy of the electronics contractor's valid State of California License.

b. Proof of Experience: Proof that the fire alarm contractor has been regularly engaged in the business of fire alarm contracting consisting of, but not limited to, engineering, fabrication, installation, and servicing of fire alarm systems of the type specified herein for at least the past ten (10)

consecutive years. Provide a statement summarizing any pending litigation involving any officer or principal of/or the company, the nature of the litigation and what effect the litigation may carry as it relates to this work in the worst case scenario. Non-disclosure of this item, if later discovered, may result, at the owner's discretion, in the contractor bearing all costs and any cost related to associate delays in the progress of the work.

c. Insurance Certificates: Copy of fire alarm contractor's current liability insurance and state industrial insurance certificates in conformance with the contract documents.

d. Project List: A List containing at least ten (10) California installations completed within the last five (5) years by the fire alarm contractor that are comparable in scope and nature to that specified in the contract document.

e. Service Capability: Documentation indicating in detail that the fire alarm contractor has competent engineering, installation, service personnel and facilities with reasonable stock of service parts within 100 air miles of the job site.

f. Authorization Letters: Letters from the fire alarm equipment manufacturer stating that the fire alarm contractor is the Factory Elite Partner, and is trained and certified for the equipment the proposes to use on this project, and is licensed to purchase and install that software required to provide the specified functions.

g. Certification:

1) Proof that the fire alarm contractor is Underwriters Laboratories, Inc. (UL) listed under the classification of "PROTECTIVE SIGNALING SERVICES-LOCAL, AUXILIARY, REMOTE STATION AND PROPRIETARY (UUJS).

2) Apprenticeship Certified – Blue Card for Life Safety System for all personal.

3) Copy of the following (NICET) Certificates. Proof that the certificate holders are a part of the fire alarm contractor's local facility servicing this project and will be actively involved in this project.

a) Technician Level 2 minimum of (5).

b) Technician Level 4 minimum of (1)

h. Proof of Trained Personnel:

1) Documentation that the fire alarm contractor has

on staff personnel factory-trained and certified for the equipment proposed for this project. Also, a statement that personnel meeting these qualifications are in the local facility, and will be maintained at that facility throughout the project and the warranty period.

5. The third section shall contain the comparative specification listing, including a complete listing of the characteristics of the equipment to be furnished next to all of the specified equipment's features and functions as stated in the specifications and data sheets. Include CSFM listing sheet for each component.

6. The fourth section shall contain an original factory data sheet for every component in the specifications.

7. The fifth section shall contain complete 1/8" = 1'-0" scale drawing showing system wiring plans.

    a. Riser Diagram.

    b. Typical Device Wiring Diagram.

    c. Wire Legend.

    d. Battery Calculation for each control panel, power supply, field power supply and network annunciator.

    e. Voltage drop for each circuit type per building.

    f. Floor Plans showing all conduits, sizes, quantity of conductors.

    g. Mounting Height of each devices and back box requirement.

    h. Zoning and address description legend.

C. Failure to comply with all of the requirements listed above will result in the rejection of the entire submittal package.

D. The Contractor shall provide two copies of an "Operating and Servicing Manual" for the system. The manuals shall be bound in flexible binders. All data shall be printed material or typewritten. Each manual shall include the following: Instructions necessary for the proper operation and servicing of the system; complete as-built installation drawings of the system; a wiring destination schedule for each circuit leaving for each piece of equipment; a schematic diagram of major components with all transistor and IC complements and replacement number.

1.06 GENERAL SYSTEM PRODUCT, INSTALLATION AND OVERALL SYSTEM WARRANTY

A. Prior to Owner acceptance, the contractor shall provide to Owner, a manufacturers product and performance warranty. This will require a

submittal of the required pre-job certification registration forms as well as the required project closing information. The Owner will only acknowledge acceptance upon submittal of a valid manufacturer's warranty.

B. The warranty shall commence from the date of final written acceptance by the Owner.

C. All conditions for obtaining the manufacturer's warranty shall be the sole responsibility of the contractor.

D. The contractor shall maintain a competent service organization and shall, if requested, submit a service maintenance agreement to the owner after the end of the guarantee period.

E. A typewritten notice shall be posted at the equipment rack that shall indicate the firm, address and telephone number to call when service is necessary. The notice shall be mounted in a neatly finished metal frame with a clear plastic window and securely attached to the inside of the door.

1.07 SPECIFIC SYSTEM PRODUCT, INSTALLATION AND OVERALL SYSTEM WARRANTY

A. The entire system shall be warranted free of mechanical or electrical defects for a period of one (1) year after final acceptance of the installation. Any material showing mechanical or electrical defects shall be replaced promptly at no expense to the Owner.

PART 2 - SYSTEM EQUIPMENT SPECIFICATION

2.01 ACCEPTABLE MANUFACTURERS

A. All equipment listed herein will be by Silent Knight Farenhyt to match existing panels and equipment on campus. No substitutions allowed.

B. It is the responsibility of the bidder to insure that the proposed product meets or exceeds every standard set forth in these specifications and the equipment's technical data sheets.

C. The functions and features specified are vital to the operation of this facility. Therefore, inclusion of a component's manufacturer in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.

D. All basic electronic equipment (not including cable) specified herein shall be produced by a single manufacturer of established reputation and experience who shall have produced similar apparatus for at least three or more years and who shall be able to refer to similar installations rendering satisfactory service.

2.02 SYSTEM REQUIREMENTS

A. Basic Performance and Capabilities

1. System shall be fully programmable and configurable on site to accommodate system expansions and facilitate changes in operation.

2. All software programs shall be stored in non-volatile programmable memory within the FACP.

    a. Loss of primary and secondary power shall not erase the instructions stored in the memory.

    b. System programming shall be password protected.

3. Alarm, supervisory and trouble signals from analog addressable devices shall be encoded onto NFPA Style 4 (Class B) signaling line circuits (SLC).

4. Initiation device circuits (IDC) shall be wired NFPA Style B (Class B).

5. Notification appliance circuits shall be wired NFPA Style Y (Class B).

6. A single ground or open on any system SLC, IDC or NAC shall not cause a system malfunction, loss of operating power or the ability to report an alarm.

7. Alarm signals arriving at the main FACP shall not be lost due to a power failure.

8. The system shall be provided with sufficient battery capacity to operate the entire system upon loss of 120 VAC power in a normal supervisory mode for a period of twenty four (24) hours with five (5) minutes of alarm indication at the end of this period.

    a. Systems that include voice evacuation shall provide sufficient battery capacity for twenty-four (24) hours with fifteen (15) minutes of alarm in lieu of the five (5) noted above.

9. The system shall automatically transfer to the standby batteries upon power failure. All battery charging and recharging operations shall be automatic. Batteries, once discharged, shall recharge at a rate to provide a minimum of 70% capacity in twelve (12) hours

B. SYSTEM FUNCTIONAL OPERATION

1. The actuation of any approved alarm initiating device shall automatically initiate the following functions:

    a. Alarm LED on the FACP shall flash.

    b. Local audible piezo electronic signal in the FACP shall sound.

    c. The alarm condition description, including the type of point and the location within the protected premises, shall be

displayed on the LCD display at the FACP and any remote annunciator(s).

d. System shall transmit the condition to a UL Listed Central Station Monitoring Facility. Supervising station shall be approved per 2025 CFC 907.6.6.

e. Printing and history storage equipment shall log the information associated with the condition, including the time and date of the alarm occurrence.

f. System output programs configured via control-by-event (CBE) programming to be activated by the particular point in alarm shall be executed, and the associated system output (alarm notification appliances and relays) shall be activated on either local outputs or points located on other network nodes.

2. The actuation of any approved supervisory alarm initiating device shall automatically initiate the following functions:

a. Supervisory LED on the FACP shall flash.

b. Local audible piezo electronic signal in the FACP shall sound.

c. The supervisory condition description, including the type of point and the location within the protected premises, shall be displayed on the LCD display at the FACP and any remote annunciator(s).

d. System shall transmit the condition to a UL Listed Central Station Monitoring Facility. Supervising station shall be approved per 2025 CFC 907.6.6.

e. Printing and history storage equipment shall log the information associated with the condition, including the time and date of the alarm occurrence.

f. System output programs configured via control-by-event (CBE) programming to be activated by the particular point in alarm shall be executed, and the associated system output (alarm notification appliances and relays) shall be activated on either local outputs or points located on other network nodes.

3. Whenever a trouble condition is detected and reported the FACP shall automatically initiate the following functions:

a. Trouble LED on the FACP shall flash.

b. Local audible piezo electronic signal in the FACP shall sound.

c. The trouble condition description, including the type of point

and the location within the protected premises, shall be displayed on the LCD display at the FACP and any remote annunciator(s).

d. System shall transmit the condition to a UL Listed Central Station Monitoring Facility. Supervising station shall be approved per CFC.

e. Printing and history storage equipment shall log the information associated with the condition, including the time and date of the alarm occurrence.

f. System output programs configured via control-by-event (CBE) programming to be activated by the particular point in alarm shall be executed, and the associated system output (alarm notification appliances and relays) shall be activated on either local outputs or points located on other network nodes.

C. TEST FUNCTIONS

1. A "Lamp Test" or "Indicator Test mode shall be a standard feature of the FACP and shall test all LED's and the LCD display on the main FACP and remote annunciators.

2. A "Walk Test" mode shall be a standard feature of the FACP.

a. The Walk Test feature shall function so that each alarm input tested shall operate the associated notification appliance for two seconds. The FACP will then automatically reset and confirm normal device operation.

b. The event memory shall contain the information on the point tested, the zone tripped, the zone restore and the individual point's return to normal.

3. A "Fire Drill mode shall allow the manual testing of the Fire Alarm System notification circuits. The Fire Drill shall be capable of being initiated at the main annunciator, remote annunciators and via a remote contact input.

4. "Bypass Mode" shall allow for any point or NAC circuit to be bypassed without affecting the operation of the total Fire Alarm System.

D. Remote Monitoring Connection

1. The fire alarm system shall be connected via Digital Alarm Communicator Transmitter (DACT) and an NFPA 72 compliant transmission channel(s) to a UL Listed Central Station Monitoring Company.

a. The fire alarm control panel shall provide an integral Digital

Alarm Communicator Transmitter (DACT) for signaling to a UL Listed Central Station Monitoring Company.

1) The fire alarm system shall transmit alarm, supervisory alarm and trouble signals with the alarms having priority over the trouble signal.

2.03 SYSTEM COMPONENTS

A. Main Fire Alarm Control Panel (FACP)

1. The existing FACP is Silent Knight Farenhyt IFP-2100ECS.

a. The basic control panel shall provide:

1) 9 amp power supply expandable to 45 amps via bus connected expander modules.

2) Network Interface Module (only required if this system is to be a part of a network)

(a) The network interface module shall be a Silent Knight Farenhyt IFP- Network Repeater KIT for fiber optic or unshielded twisted pair cable connections.

(1) 16AWG unshielded twisted pair FPL (SLC) cable shall be used for copper wiring network connections up to a maximum distance of 3000 feet.

(2) 6-strand, 62.5/125 micron multimode fiber optic cable with ST connectors shall be used for fiber optic cable connections.

(a) Installers of fiber optic cable shall be certified by the manufacturer of the cable and connectivity used.

(b) Fiber optic cable shall be tested utilizing and industry standardized method.

(c) Provide fiber optic patch cables as required for a complete and operable system.

(3) One (1) Signaling Line Circuit (SLC) capable of supporting 159 addressable detectors and 159

addressable modules

(a) Additional SLC's may be added via expander modules to a maximum of 636 addressable points per panel, 10,176 addressable points per network

(4) Eight (8) programmable "Flexputs"

(a) Programmable Flexput Circuits shall be capable of being programmed as supervised reverse polarity notification appliance circuits, supervised auxiliary power circuits (continuous or resettable), door holder power or as input circuits in Class A or Class B configuration to support dry contact devices or compatible two-wire smoke detectors

(5) 160 character LCD annunciator

(a) Capability of supervising 8 additional remote annunciators

(6) Integral UL listed Digital Alarm Communicator Transmitter (DACT)

(7) Ability to automatically test smoke detectors in compliance with NFPA Standards to ensure that they are within listed sensitivity parameters

(8) Compensation for accumulation of contaminants that affect detector sensitivity

(9) Day/night sensitivity adjustments

(10) Maintenance alert feature (differentiated from trouble condition)

(11) Detector sensitivity selection

(12) Over-current Protection

(a) All low-voltage circuits shall be protected by microprocessor controlled power limiting or have a self-restoring polyswitch.

(13) Ground Fault Detection

(a) The ground fault detector shall operate the general trouble devices as specified but shall not cause an alarm to be sounded.

(b) Ground fault shall not interfere with the normal operation of the system, such as alarm or trouble conditions.

(14) Auto-programming mode (Jumpstart)

(a) Jumpstart feature shall automatically enroll all properly connected devices into a functional system within 60 seconds of power up of the panel

(15) Ability to upgrade the core operating software on site or over the telephone

(16) RS-485 Serial Communication Bus (S-bus). Systems that do not communicate with Intelligent Modules via RS-485 Serial Communication Bus shall not be deemed equal and shall not be acceptable for this project.

(a) S-bus shall be of Class A or Class B configuration with a total bus length of 6000 feet.

2. The FACP shall be capable of operating and supervising notification appliance devices as well as addressable initiating detection devices and an integrated supervised dual line digital communicator.

B. Fire Alarm Control Panel with integral Emergency Voice/Alarm Communication System.

1. The existing Voice Evacuation Control Panel is Silent Knight

Farenhyt IFP-2000ECS.

a. The existing IFP-2000ECS shall be the FACP on all systems where Networking is not required for compliance with CFC required Emergency Voice/Alarm Communication in K -12 schools.

b. Remote Voice Evacuation Amplifiers shall be:

1) Silent Knight Farenhyt Farenhyt ECS-50W

c. Microphone shall have posted operating instructions per NFPA 72.

C. NETWORK NODES

1. Network Nodes, if required, shall be compatible with existing Silent Knight Farenhyt IFP-2100ECS.

a. All Network systems shall have at least one node for compliance with CFC required Emergency Voice/Alarm Communication in K -12 schools.

b. All Network Nodes shall have the capability of being connected with either copper cable or fiber optic cable.

D. The Serial/Parallel Interface Gateway Module Shall Be Silent Knight Farenhyt Farehnyt 5824

1. The 5824 shall be connected to the S-bus and provide serial and parallel ports for connection to peripheral devices.

a. Point of connection for SY-MTIP.

E. Remote Power Supply

1. The Intelligent Remote Power Supply shall be by Silent Knight Farenhyt.

a. The Intelligent Remote Power Supply shall be connected to the FACP via S-bus.

1) The Remote Power Supply shall have the capability of accommodating all add-on modules.

2) The Remote Power Supply shall have 6 amps of output power, 4 output circuits that may be programmed as NAC or Auxiliary Power.

b. The Intelligent Remote Power Supply shall act as a bus repeater allowing connection of additional S-bus devices to a maximum wiring distance of 6,000 feet from the power supply.

c. The Intelligent Remote Power Supply shall have on-board synchronization for System Sensor NAC devices.

F. Signaling Line Circuit (SLC) Devices:

1. Each SLC shall be capable to accommodating 159 addressable detectors and 159 addressable modules.

2. Provide SLC devices as indicated on the construction drawings. All devices shall be listed for compatibility with the existing Silent Knight Farenhyt IFP-2100ECS FACP.

a. SLC Isolation Module shall be by Silent Knight Farenhyt.

b. Ceiling mounted smoke detector shall be Silent Knight Farenhyt IDP-Photo.

c. Ceiling mounted fixed temperature heat detector shall be Silent Knight Farenhyt IDP-Heat.

d. Attic mounted heat detector shall be Silent Knight Farenhyt IDP-Heat-HT.

e. Addressable Relay Module shall be Silent Knight Farenhyt IDP-Relay.

f. Addressable Input Module shall be Silent Knight Farenhyt IDP-Monitor.

G. Notification Appliance Circuit (NAC) Devices:

1. NAC devices shall be the product of System Sensor.

H. System/Wire Cable

2. All Fire Alarm System Wire and Cable shall be installed in conduit, unless noted otherwise.

a. Interior

1) SLC cable shall be #16AWG, 2-conductor, unshielded, FPL, red jacket.

b. SLC cable shall be California State Fire Marshal (CSFM) listed.

1) NAC Wire shall be #12 AWG THHN/THWN, stranded color red and black.

2) S-bus cable shall be #16AWG, 4-conductor, unshielded, FPL, red or black jacket.

a) S-Bus cable shall be California State Fire

Marshal (CSFM) listed.

3) Speaker cable shall be #16AWG, 2-conductor, shielded, FPL, red jacket.

a) Speaker cable shall be California State Fire Marshal (CSFM) listed.

4) Network Fiber Optic Cable shall be 6-strand 62.5/125 micron multimode loose tube Indoor/Outdoor AMP 1-1664234-5 or equal.

c. Exterior

1) SLC cable shall be #16AWG, 2-conductor, unshielded, FPL, water-blocked, black jacket.

a) SLC cable shall be California State Fire Marshal (CSFM) listed.

2) NAC Wire shall be #12 AWG THHN/THWN, stranded color red and black.

3) S-bus cable shall be #16AWG, 4-conductor, unshielded, FPL, water-blocked, black jacket.

a) S-Bus cable shall be California State Fire Marshal (CSFM) listed.

4) Speaker cable shall be #16AWG, 2-conductor, shielded, FPL, water-blocked, black jacket.

a) Speaker cable shall be California State Fire Marshal (CSFM) listed.

5) Network Fiber Optic Cable shall be 6-strand 62.5/125 micron multimode loose tube with ST connectors.

I. CONDUIT AND SURFACE RACEWAY

1. All conduit, surface raceways, outlet boxes, junction boxes, pull boxes, terminal cabinets, and similar devices required in this section of the work shall be provided under Division 26 10 00 and as shown on drawings.

2. Conduit and surface raceways shall comply with the requirements of Section 26 10 00 BASIC ELECTRICAL MATERIAL.

3. Conduit shall not enter the Fire Alarm Control Panel, or any other remotely mounted Control Panel equipment or backbox, except where conduit entry is specified by the FACP manufacturer.

4. All fire alarm related conduits shall be clearly marked as “Fire Alarm

System" and painted red in color to indicate such system.

J. TERMINAL CABINETS AND JUNCTION BOXES:

1. All boxes and cabinets shall be UL listed for their use and purpose.

2. Terminal cabinets shall comply with the requirements of Section 26 10 00 Terminal Cabinets.

3. Provide terminal blocks for all conductors entering and/or exiting each terminal cabinet.

4. Provide (2) 1" conduit only from each terminal cabinet stubbed into an adjacent ceiling space and (2) 1" conduit only stubbed outside the building into an 11" x 17" flush-in-grade concrete pullbox.

5. Provide a fire alarm documentation cabinet per NFPA 72.

PART 3 – EXECUTION

3.01 General Installation Requirements

A. The wiring of the system shall be executed in accordance with the drawings and the equipment manufacturer's wiring diagrams. If any variations in these requirements occur, the contractor shall notify the architect before making any changes. It shall be the responsibility of the Factory- Elite Partner of the approved equipment to install the equipment and guarantee the system to operate as per plans and specifications.

B. Furnish all conduit, junction boxes, conductors, equipment plugs, terminal strips, etc., and labor to install a complete and operable system.

C. The cables within the rack or cabinets shall be carefully cabled and laced with no. 12 Cord waxed linen lacing twine or ty-raps. All cables shall be numbered for identification.

D. Splices of conductors in underground pull boxes is not permitted.

E. The labor employed by the contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the owner and architect to engage in the installation and service of this system.

F. The contractor shall thoroughly clean all equipment and materials. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc., the contractor shall remove all debris and rubbish occasioned by the electronic systems work from the site. The contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., Caused by the performance of this work.

G. The system must meet all local and other prevailing codes.

H. All cabling installations shall be performed by qualified technicians.

I. All cabling shall be splice free.

J. In order to ensure the least amount of cable untwisting, it is required that all cables shall be stripped using a special tool.

K. The use of lubricants (i.e. Yellow 77) to facilitate the installation of cables in conduits is highly discouraged. If such a lubricant must be used, the contractor shall verify the acceptability of the lubricant to be used with the cable manufacturer, prior to using such a lubricant.

L. Under no circumstance are "channel locks" or other pliers to be used.

M. All firewalls penetrated by structured cabling shall be sealed by use a non-permanent fire blanket or other method in compliance with 2025 California Electric Code (CEC) or other prevailing code. The contractor must not use concrete or other non-removable substance for fire stopping on cable trays, wireways or conduits. Contractors who use this method will be required to replace all cables affected and provide the original specified access to each effected area.

N. Provide p-touch label of approximately 1 inch wide with red lettering for each initiating device that is hidden from view. Tags shall indicate the name and type of device: Heat Detector, or Duct Smoke Detector. Tags shall be permanently attached on access panel or t-bar grid which is used to access a hidden device.

3.02 SPECIFIC SYSTEM INSTALLATION REQUIREMENTS

A. The entire system shall be installed in a workmanlike manner in accordance with approved manufacturers manuals and wiring diagrams. The contractor shall furnish all wiring, conduit, outlet boxes, junction boxes, terminal cabinets and similar devices necessary for the completed installation..

B. Installation off conduit, outlet boxes, junction boxes, terminal cabinets, special back boxes and similar devices shall comply with the requirements of Section 26 10 00 General Electrical Requirements.

C. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detector heads shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.

D. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas. Verify with the Project Architect prior to any surface mounted installations.

E. All penetrations of floor slabs and fire walls, shall be fire stopped in accordance with the electrical specifications.

F. Duct mounted Smoke Detectors shall be furnished and wired by this Contractor and installed by the Mechanical Contractor. All shutdown and interface wiring shall be performed by the Electrical Contractor. All air pressure differential testing shall be performed by the Mechanical/Air Balance Contractor.

G. The sprinkler flow and tamper switches shall be furnished, installed and adjusted by the Sprinkler Contractor, wired and tested by this Contractor.

3.03 SYSTEM START-UP

A. All start-up programming and system commissioning shall be performed by a manufacturer's trained and certified technician currently employed by the System Supplier/Installer.

3.04 SYSTEM VERIFICATION

A. Subsequent to system start-up the system installer shall perform a 100% system pre-test to verify that the following features are functioning properly.

1. All notification appliances.

2. All initiation devices.

3. All control modules.

4. All monitor modules.

5. Communication link to monitoring service.

B. Verify intelligibility, audibility, message priority, tones, etc. Refer to test protocols and methods of measuring intelligibility using NFPA 72, Annex D, D.1 though D.6. Testing shall be performed with a District representative present to confirm the voice message is intelligible.

3.05 ACCEPTANCE TESTING

A. The system installer shall, in the present of the Inspector of Record (IOR), perform 100% testing as noted in System Verification above.

3.06 IN SERVICE TRAINING

A. The Contractor shall instruct personnel designated by the District/Owner in the proper use, basic care and maintenance of the system beyond the warranty period. Contractor shall provide up to 8 hours of in-service training with this system.

3.07 FACTORY TRAINING & CERTIFICATION

A. Not required under this Contract.

3.08 CONTRACT CLOSE-OUT DOCUMENTATION

A. Contractor shall provide the following:

1. One reproducible hard copy of project record drawings.

2. One hard copy of manufacturer's maintenance and operation manuals.

3. One CD containing manufacturer's maintenance and operation manuals in PDF format.

4. One copy of system warranty.

3.09 WARRANTY

A. The Contractor shall warrant the equipment to be new and free from defects in material and workmanship, and will, within one year from the date of installation, repair or replace any equipment found to be defective. This warranty shall not apply to any equipment that has been subject to misuse, abuse, negligence or unauthorized modification.

B. Provide the NFPA certificate to the Owner, Local Fire Official, Architect and DSA.

END OF SECTION

SECTION 31 10 00
SITE CLEARING

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  - 1. Site Clearing and Grubbing of, but not limited to:
    - a. Removal of vegetation, trees, shrubs, stumps, roots, masonry, concrete, rubbish, debris, and other materials.
    - b. Removal of bituminous and concrete pavement.
    - c. Removal of utility lines.
    - d. Removal of fences and gates.
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
  - 1. 31 20 00 Earth Moving
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES
- A. The "Greenbook", Standard Specifications for Public Works Construction, current edition (S.S.P.W.C.).

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS
- A. Design Requirements, Performance Requirements
  - 1. All specified construction materials and construction methods shall comply with the "Greenbook", Standard Specifications for Public Works Construction, current edition.

1.05 SUBMITTALS
- A. General
- B. Product Data
- C. Shop Drawings
  - 1. Submit scaled site plans indicating extend to site clearing and grubbing.
- D. Samples
- E. Quality Assurance/Control Submittals
- F. Closeout Submittals

1.06 QUALITY ASSURANCE
- A. Qualifications
- B. Regulatory Requirements
  - 1. Contractor shall obtain a demolition permit from the governing agencies having jurisdiction prior to the start of work.
  - 2. Contractor shall comply with all requirements of the governing agencies having jurisdiction.
- C. Certifications

D. Field Samples
E. Mock-ups
F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING
A. Packing, Shipping, Handling, and Unloading
B. Acceptance at Site
C. Storage and Protection
D. Waste Management and Disposal
1. See section 01 74 19 Construction Waste Management and Disposal.
2. In accordance with S.S.P.W.C., Section 300-1.3.

1.08 PROJECT CONDITIONS
A. Project Environmental Requirements
1. Comply with applicable sections of the Storm Water Pollution Prevention Plan, including, but not limited to, erosion control, soil, waste and maintenance areas.
2. Comply with applicable codes for dust control measures.
B. Existing Conditions
1. The existing soil conditions at this site have been investigated and a report of findings prepared by UES Professional Services, Inc., titled:

Geotechnical and Geohazard Investigation Report
T Granite Hills TK-8 Upper Campus Expansion
h 200 Ethanac Avenue, Perris CA 92570
i Project No.A26167.00338.000
1. GEOTECHNICAL/GEOHAZARD INVESTIGATION REPORT, July. 31, 2026 2. None 3. None n f

This information is available as supplemental information only and no guarantee of existing soil or other conditions is intended.
2. It shall be the Contractor's full responsibility to furnish and maintain all temporary barricades, warning lights and other types of protection and prevent accidental injury to the general public and all personnel on the project.
3. All existing improvements and all existing active utility lines to remain (whether above or below ground) within the new construction area shall be properly and adequately protected from damage during the entire construction period. It shall be the responsibility of the Contractor to restore to their original condition any of these existing items that are damaged or disturbed in any way.
4. Contractor shall be responsible to protect adjacent properties, roads, rights-of-way, utilities and other improvements above or below ground from damage while performing the work.

1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP

1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS
2.02 EXISTING PRODUCTS
2.03 MATERIALS
2.04 MANUFACTURED UNITS
2.05 EQUIPMENT
2.06 COMPONENTS
2.07 ACCESSORIES
2.08 MIXES
2.09 FABRICATION
2.10 FINISHES
2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.01 INSTALLERS
3.02 EXAMINATION
- A. Site Verification of Conditions
  1. The Contractor shall make a minimum of 1 (one) visit to the project areas prior to start of work and make a thorough inspection of the site, in order to best familiarize themselves with the scope of site clearing and demolition required to complete the project per the contract documents.

3.03 PREPARATION
- A. Protection
  1. In accordance with S.S.P.W.C., Section 300-1.2.
  2. Protect all areas indicated to remain prior to the start of any site clearing or demolition.
  3. Provide temporary fencing to protect areas and facilities subject to damage from site clearing or demolition work or as indicated on the drawings.
- B. Surface Preparation

3.04 ERECTION
3.05 INSTALLATION
3.06 APPLICATION
3.07 CONSTRUCTION
- A. All clearing and grubbing shall be in accordance with S.S.P.W.C., Section 300-1.
- B. Unless otherwise indicated to remain, completely remove from the entire site any existing vegetation, trees, shrubs, bushes, debris, poles and pole footings, posts and post footings, structures, foundation, curbs, walls, steps, slabs, pavement, substructures, underground utilities, cesspools, weir boxes, irrigation lines and appurtenances, septic tanks, fences, gates, basement walls and slabs, tanks, manure, etc., including any other items

necessary to construct the new work under this contract. Sawcut and remove portions of existing concrete paving and/or asphaltic concrete paving as indicated on the Drawings.

B. Trees and tree stumps, unless indicated to remain, shall be removed, together with the bulk of the roots, to a minimum depth of 6 feet below the existing grade within a radius of 12 feet beyond perimeter of trunk at ground line.

C. During demolition operations, thoroughly wet down debris to allay the dust as necessary. Remove debris from the site as it accumulates. Accumulation of debris will not be permitted.

D. Holes resulting from the removal of trees shall be backfilled in accordance with section 31 20 00 Earth Moving, for fills.

E. Holes resulting from the removal of septic tanks, cesspools, or any other underground tanks or structures shall be backfilled in accordance with Section 31 20 00 Earth Moving, for fills.

F. Disking existing vegetation into existing surface soils will not be permitted under any circumstances.

G. Clear existing drainage swales of any existing debris, wash sediments, etc.

3.08 REPAIR/RESTORATION

3.09 RE-INSTALLATION

3.10 FIELD QUALITY CONTROL

3.11 ADJUSTING

3.12 CLEANING

A. All items removed shall be disposed of off the property in a legal manner, in accordance with regulations of the City, County, and State authority.

3.13 DEMONSTRATION

3.14 PROTECTION

3.15 SCHEDULES

END OF SECTION

SECTION 31 20 00
EARTH MOVING

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  - 1. Work of this section includes all required excavation, grading, preparation of subgrade for fills, proper placement of fills, including backfilling and compaction, the watering, rolling and compacting of fill material in place and the finish grading all as required by the drawings and as specified herein.
  - 2. Geotechnical Tests
  - 3. Special Requirements
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
  - 1. Excavation and backfill for utility lines specified under Mechanical and Electrical Sections
- D. Related Sections
  - 1. 31 10 00 Site Clearing
  - 2. 31 23 26 Base Course
  - 2. 32 12 16 Asphalt Paving
  - 3. 32 13 13 Concrete Paving
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES
- A. The "Greenbook", Standard Specifications for Public Works Construction, current edition (S.S.P.W.C.).
- B. Special inspection for engineered fill and compaction, Title 24, Part 2 C.C.R., 2025 C.B.C. Appendix J.
- C. California Department of Transportation, (Caltans), California Test Method (CTM) Test No. 217 – Method of Test for Sand Equivalent
- D. ASTM D4829 - Standard Test Method for Expansion Index of Soils
- E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort

1.03 DEFINITIONS
- A. USEPA – United States Environmental Protection Agency
- B. DTSC - State of California Department of Toxic Substances Control

1.04 SYSTEM DESCRIPTION
- A. Design Requirements, Performance Requirements
  - 1. All specified construction materials and construction methods shall comply with the "Greenbook", Standard Specifications for Public Works Construction, current edition.
  - 2. All grading work shall be performed in accordance with:
    - a. Title 24, Part 2 C.C.R., 2025 C.B.C. Appendix J.

b. The grading code of the County of Riverside, and any special requirements of the permit.

1.05 SUBMITTALS

A. Product Data

B. Shop Drawings

C. Samples

D. Quality Assurance/Control Submittals

1. Grading Schedule

a. Establishes the construction of the building pad area as a priority of grading construction

b. Appropriate or required reports and certifications from the Soils/Foundation Engineer, Civil Engineer, and governmental authority necessary to commence foundation excavation and building construction.

E. Closeout Submittals

1. A final grading report shall be submitted by the Geotechnical Consultant in accordance with Title 24, Part 2, C.C.R., 2025 C.B.C. Appendix J.

2. At the completion of grading operations and prior to building, A.C. pavement and concrete paving construction, Contractor shall provide an as-built grading plan at his own expense. As-built grading plan shall be prepared, signed and dated by a licensed land surveyor or Registered Civil Engineer licensed to practice land surveying in California.

1.06 QUALITY ASSURANCE

A. Qualifications

1. All imported material and sources for import material shall be approved by the Geotechnical Consultant prior to hauling on site. Contractor shall be responsible for communicating the necessary information to the Geotechnical Consultant in a timely manner, so the Geotechnical Consultant may perform appropriate testing and reporting.

B. Regulatory Requirements

1. No clearing, demolitions, filling and backfilling, or grading operations shall be performed without the presence of a representative of the Geotechnical Engineer of Record.

2. Operations undertaken at the site without the Geotechnical Consultant present may result in exclusions of affected areas from the final compaction report for the project.

3. The presence of the Geotechnical Consultant will be for the purpose of providing observation and field testing and will not include any supervising or directing of the actual work of the Contractor, directing their employees or agents. Neither the presence of the field representative nor the observations and testing by the Geotechnical Consultant shall excuse the Contractor in any way for defects discovered in the Contractor's work. The Geotechnical Consultant shall not be responsible for job or site safety on this project, which shall be the sole responsibility of the Contractor.

C. Certifications

E. Field Samples

F. Mock-ups
G. Pre-installation Meetings
1. An onsite pre-installation meeting with Architect, Contractor, the Geotechnical Consultant, Civil Engineer, Inspector, and the Utility Line and Earthwork Subcontractor(s) is required prior to all grading related operations. **ATTENDANCE IS MANDATORY.**

1.07 DELIVERY, STORAGE, AND HANDLING
A. Packing, Shipping, and Handling, and Unloading
1. During all grading operations, water shall be applied to the surfaces in the working area at frequent intervals and in sufficient quantities to allay the dust and for proper compaction. No other method will be permitted.
B. Acceptance at Site
C. Storage and Protection
D. Waste Management and Disposal
1. Surplus earth material not needed for the completion of the grading shall be removed from the site by the Contractor and disposed of in a legal manner.

1.08 PROJECT CONDITIONS
A. Project Environmental Conditions
1. All earth products brought to the site shall meet or exceed USEPA and DTSC regulations for clean fill. Proof of compliance is the responsibility of the Contractor. Provide written certification that import fill meets those requirements.
B. Existing Conditions
1. The existing soil conditions at this site have been investigated and a report of findings prepared by UES Professional Services, Inc., titled:

Geotechnical and Geohazard Investigation Report
Granite Hills TK-8 Upper Campus Expansion
200 Ethanac Avenue, Perris CA 92570
Project No.A26167.00338.000
1. GEOTECHNICAL/GEOHAZARD INVESTIGATION REPORT, July. 31, 2026 **2. None** **3. None**

This information is available as supplemental information only and no guarantee of existing soil or other conditions is intended.
2. Should soil of inadequate density and bearing capability be encountered at the elevations indicated on the drawings, or where new fill is to be placed upon existing loose fill material exposed by excavation, the excavation shall be carried to the depth required to attain soil of bearing quality as determined by the Geotechnical Consultant. The adequacy of all soil bearing value shall be determined by the Geotechnical Consultant.

1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY

1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS
2.02 EXISTING PRODUCTS
2.03 MATERIALS
- A. All materials shall be in accordance with S.S.P.W.C., Part 2.
- B. The Contractor shall import any and all additional fill material required to complete the grading on this project. All earth imported shall be of granular nature with sufficient binder to form a firm, stable, unyielding subgrade. Adobe or clay soils will not be acceptable. All earth imported shall be clean and free from all rubbish and debris and rock larger than 3 inches in maximum dimensions, not have a sulfate content greater than 1,000 parts per million and be subject to the approval of the Geotechnical Consultant. Imported fill material shall have a very low expansion potential and have an expansion index of less than 21. Imported material to be used in areas to receive planting shall be of such quality as to support plant life.
- C. Fill material shall be clean, well-pulverized soil free of vegetation matter, rocks larger than 3 inches in any dimension, and other debris, and shall be subject to approval by the Geotechnical Consultant.
- D. Backfill material for storm drain and utility lines shall be non-expansive granular materials, such as clean sand, and shall be placed in a minimum thickness of 6-inches for bedding and backfilled to 12-inches above top of pipe. Bedding sand shall have a sand equivalent value of 30 or greater determined in accordance with California Test 217 – Method of Test for Sand Equivalent.
- E. Borrow pits shall not be dug on the site.

2.04 MANUFACTURED UNITS
2.05 EQUIPMENT
2.06 COMPONENTS
2.07 ACCESSORIES
- A. Provide cribbing, sheathing, and shoring necessary to safely retain the earth banks and protect excavations and adjoining grades from caving and other damage resulting from excavating, together with suitable forms of protection against bodily injury to personnel employed on the work and the general public. The responsibility for the design, installation, and maintenance of required cribbing and shoring shall be entirely that of the Contractor and shall meet the approval of the State Division of Industrial Safety and local governing agencies' requirements.

2.08 MIXES
2.09 FABRICATION
2.10 FINISHES
2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.01 INSTALLERS
3.02 EXAMINATION
3.03 PREPARATION
- A. Protection
  1. Contractor shall protect adjacent properties, roads, rights-of-way, easements and existing improvements from damage during the life of the grading operation and prevent caving, sloughing or the placing of materials or stock piles on adjacent properties.
  2. Utility lines and structures shown shall be protected and treated as indicated. Where work not shown is encountered, report it to the Architect before proceeding with excavation. The Contractor shall bear the costs for all repairs to damaged or broken utilities and any damages related thereto.
- B. Surface Preparation
  1. Prior to any excavation or filling operation, the entire area within the limits of work containing vegetation or manure shall be excavated to a minimum depth to ensure removal of all vegetation and manure. This material shall be disposed of off the site in a legal manner.

3.04 ERECTION
3.05 INSTALLATION
3.06 APPLICATION
3.07 CONSTRUCTION
- A. General
  1. All earth moving shall be in accordance with S.S.P.W.C., Section 300 and 301.
- B. Excavation
  1. Excavate to the depths, lines, and grades indicated. Excavate sufficiently over-size to permit installation and removal of concrete forms and all other required work.
  2. Notify the Architect, Structural Engineer, Project Inspector, and Geotechnical Consultant of Record min. (5) days before foundation excavations are ready for inspection.
  3. The bottoms of footings shall be free of loose material, debris, and water before concrete is placed.
  4. Sequencing of the work to ensure that one part of the excavating does not interfere with another part.
  5. Cut banks shall be neatly trimmed to the required finish surface as the cut progresses, or the Contractor shall have the option of leaving the cuts full and finish grading by mechanical equipment which will produce the finish surfaces as shown on the drawings.
  6. All cut or "at grade" concrete and asphalt pavement areas shall be scarified to a minimum depth 8-inches below subgrade and 24-inches beyond limits of improvements and compacted to a density of not less than 90% of maximum dry density.
  7. Footing pads, if poured neatly, may be excavated to the net pad widths plus two inches if approved by the Structural Engineer of Record. Approval will not be given until the completed excavation has been inspected.

8. Should footing excavations exceed reburied dimensions or should sloughing occur, fill such extra space with concrete at no additional cost to the contract. If unsuitable material is found at the indicated depths, immediately notify the Architect and Geotechnical Consultant.

C. Filling

1. Prior to placing new fill in all other areas, the exposed cleared surface should be plowed, scarified, or otherwise processed to a depth of at least 12 inches, watered and/or aerated, as required, thoroughly mixed to a uniform, near optimum moisture condition, and recompacted to at least 90 percent of the ASTM D-1557 test standard.
2. All recompacted and new fill required to secure final subgrade elevations should be spread, water and/or aerated as required, thoroughly mixed to a uniform over optimum moisture condition, and compacted in approximated 8-inch thick loose lifts to at least 90 percent. Backfilling of excavations made for removal of any existing buried elements during site clearing should also be performed in this manner.
3. Imported fill materials should consist of clean soils, free from vegetation, debris, or rocks larger than 3 inches. The Expansion Index value shall be less than 20 per geotechnical recommendations. ("Very Low" expansive per ASTM D4829) unless approved by the Geotechnical Consultant.
4. Where fills are placed on existing slopes exceeding a slope of five horizontal to one vertical, the slopes shall be benched in accordance with the Geotechnical Consultant's requirements and local governing public agencies' requirements and compacted as herein specified before placing fill material on same, so that all fills shall be placed in horizontal layers as specified. Widths of benches shall be as directed by the Geotechnical Consultant.
5. Rock encountered in the excavation on this site may, at the option of the Contractor, be broken up into pieces not larger than three inches in maximum dimension and be incorporated in the fill material if spread as directed by the Geotechnical Consultant. Otherwise, all rocks larger than three inches in maximum dimensions shall be removed from the site. Rocks and stones larger than one inch in maximum dimension will not be permitted within the top 12 inches of finished grade in non-paved areas.
6. Fill banks shall be graded full and compacted beyond the grade of the finish bank. After the banks have been filled, they shall be trimmed to the finish grades and limits shown on the drawings.

D. Backfilling

1. Place no backfill until work in excavations has been approved. Remove cave-ins and loose soil to permit inspection.
2. Place backfill in layers which will compact to six inches maximum, concurrently on both sides of footings and walls. Thoroughly compact each layer with mechanical tampers, adding water as required to obtain optimum moisture content, and compact as set forth in paragraph E. Compaction.
3. Backfill placed in narrow, restricted areas, such as along utility trenches, may possibly be placed in up to 8-inch thick lifts,

depending on the materials, procedures and equipment being employed. Backfill consolidation by flooding or jetting is expressly prohibited. In any case, all backfill should be mechanically compacted to at least 90 percent of the aforementioned test standard.

4. Prior to placing backfill within the remaining excavation behind new retaining walls, these areas should first be cleared of all significant vegetation, construction debris, loose and/or disturbed soils, etc. All new backfill should be spread, watered or aerated as required, thoroughly mixed to a uniform near optimum moisture condition and compacted by mechanical means in approximate 6 to 8-inch thick lifts. The degree of compaction obtained should be at least 90 percent of maximum dry density per the ASTM D-1557-91 laboratory test standard.
5. If groundwater is encountered during excavations, dewatering may be necessary to create stable trench conditions. If groundwater is minimal, dewatering may be achieved by plating the area with gravel and implementing portable pumps. If groundwater is excessive, a qualified dewatering specialist shall be retained to design the appropriate dewatering system, which should be reviewed and accepted by the Geotechnical Consultant prior to implementation.
6. Trench bottoms shall be firm and unyielding prior to utility installation. Trench excavation bottoms that are soft and wet shall be overexcavated a minimum depth of 12 inches and a 12-inch thick layer of crushed aggregate base (CAB) shall be placed and compacted to achieve subgrade.

E. Compaction

1. All fills shall be compacted to at least 90 percent of maximum density obtainable using the ASTM test procedure D-1557. All areas which are scarified shall be recompacted to these same requirements.
2. All earthwork operations should be subject to compaction monitoring field observation and testing by the Geotechnical Consultant. The Geotechnical Consultant should be notified at least two days in advance of the start of grading. A joint meeting between a representative of the Client, the Contractor and the Geotechnical Consultant is recommended prior to grading to discuss specific procedures and scheduling.
3. Compaction by flooding or jetting is prohibited, unless authorized by the Geotechnical Consultant.
4. The upper 8 inches of the subgrade soils should be moisture-conditioned to near optimum moisture content, compacted to at least 95 percent relative compaction (ASTM D1557) and kept in this condition until the pavement section is constructed.

F. Finish Grading

1. The entire area within the limits of grading as indicated on the Drawings shall be constructed to the lines, grades, elevations, slopes, and cross sections indicated on the Drawings. When the grading has been completed, the areas shall be rolled smooth with a steel tandem roller or equal.

2. Fine grade to bring areas to required lines and grades. The subgrade elevation within the building area for slabs on grade (without a base course) shall be within 0.50 inch along a 10-foot straight edge.
3. Slope finish grades to drain surface water away from buildings, walks, paving, and other structures. Generally, grade with uniform slope between points where elevations are given, or between such points and existing grades. Excavate and grade swales to provide drainage away from and around buildings.
4. Areas to Receive Paving or Surfacing: Review plans and details for each area. See plans for paving and base course thickness. Review Drawings for site work details. The upper 6 to 12 inches of roadway subgrade shall be re-processed, brought to optimum moisture content and re-compacted to a minimum 95% relative compaction in the upper 6 inches.
5. Areas to receive building slab-on-grade: Review plans and details for thickness of slabs and granular fill under slabs.
6. Areas to receive topsoil and/or planting: Where not otherwise indicated, areas outside of buildings shall be given uniform slopes between points for which finish grades are shown, or between such points and existing established grade, except that vertical curves or roundings shall be provided at abrupt changes in slope.
7. Rocks or cobbles larger than 1-inch in diameter shall not be placed in the upper 12-inches of planting area fill. and rocks or cobbles larger than 3/4 inch shall not appear on the finish graded surface.
8. It shall be the Contractor's full responsibility to take all measures necessary during grading to protect slope areas, both cut and fill, and adjacent properties form storm damage and flood hazard originating on this project until final acceptance by the Owner. It shall be the Contractor's responsibility to maintain completed slopes until all slopes are in satisfactory compliance with the job specifications.
9. Completed building, exterior concrete pavement, and A.C. pavement subgrades should be trimmed and rolled to a firm smooth surface. Final watering and rolling should be performed immediately prior to placing concrete or paving.

G. Planting Areas
1. The top 12 inches of soil within all designated planted areas shall be imported top soil or existing site soil capable of supporting plant growth. The 12-inch layer shall be measured down from the finish grade shown on the project drawings.

H. Trenching and Over-Cuts
1. Prior to replacing compacted fill in over-cut building, concrete flatwork and A.C. paved areas, the exposed over-cut surface should be plowed, scarified, or otherwise processed to an additional depth of at least 8 inches, water and/or aerated as required, thoroughly mixed to an uniform, near optimum moisture condition, and recompacted to at least 90 percent of maximum dry density obtainable using the ASTM D-1557 test standard.
2. All recompacted and new fill should be spread, watered, mixed and compacted by mechanical means in approximate 8 inch thick, lifts or less, to at least 90 percent compaction per the aforementioned standard.

3.08 REPAIR/RESTORATION

3.09 RE-INSTALLATION

3.10 FIELD QUALITY CONTROL

A. Site Test, Inspections

1. A Geotechnical Consultant designated by the Owner will be engaged to perform continuous inspection of the placing and compacting of all fills and backfills within the limits of grading of this project. All work shall be done in accordance with these specifications and as recommended and approved by the Geotechnical Consultant. Costs for all such inspections and tests shall be paid by the Owner. The Contractor shall be responsible for notifying the Geotechnical Consultant in advance so that he may be present to perform his services as needed. The Geotechnical Consultant shall approve all subgrades prior to placement of fill or placement of forms and reinforcing.
2. The Geotechnical Consultant shall also make an investigation of the fill material to establish the ability of the soil to sustain the vertical loads to be imposed on the fill by the proposed structure.
3. The Geotechnical Consultant shall submit compaction reports to the Architect, DSA, and the Civil Engineer at the completion of the work, including test results and plot plans indicating the locations from which the tested samples of fill were taken. The Geotechnical Consultant shall keep the Architect informed on the progress of the grading work.

3.11 ADJUSTING

3.12 CLEANING

A. Upon completion of work in this Section, remove rubbish, trash, and debris resulting from operations. Remove disused equipment and implements of service, and leave entire area involved in a neat, clean, and acceptable condition.

3.13 DEMONSTRATION

3.14 PROTECTION

A. Protect sloped areas, both cut and fill, existing improvements and adjacent properties from storm damage and flood hazard originating on this project until final acceptance by the Owner.

B. Maintain completed slopes until all slopes are in satisfactory compliance with the job specifications, all berms have been properly constructed, and all associates drainage devices have met the requirements of the Architect. It shall also be the Contractor's responsibility to prevent silt run-off from the limits of work.

C. Prevent silt runoff from the limits of work in accordance with the Stormwater Pollution Prevention Plan.

3.15 SCHEDULES

A. Over-Excavation

1. Building Footprints: See Geotechnical Report
2. Site Walls: See Geotechnical Report
3. Flatwork: See Geotechnical Report

END OF SECTION

SECTION 31 23 26
BASE COURSE

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  1. Sand
  2. Base Materials
  3. Soil Sterilization
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
  1. 03 30 00 Cast-In-Place Concrete
  2. 32 12 16 Asphalt Paving
  3. 32 13 13 Concrete Paving
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES
- A. The "Greenbook", Standard Specifications for Public Works Construction, current edition.
- B. Standard Specifications, State of California, California State Transportation Agency, Department of Transportation, current edition (Caltrans)

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS
- A. Design Requirements, Performance Requirements
  1. All specified construction materials and construction methods shall comply with the "Greenbook", Standard Specifications for Public Works Construction, current edition.

1.05 SUBMITTALS
- A. Product Data
- B. Shop Drawings
- C. Samples
  1. Submit physical samples of specified base course material.
- D. Quality Assurance/Control Submittals
  1. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, Qualification Statements
     a. Submit material source, technical information and test data for base materials. Gradation and quality certifications shall be dated within 30 days of the submittal.
     b. Submit written certification that crushed miscellaneous base does not contain Polychlorinated biphenyls (PCB) above laboratory detection limits when tested in accordance with EPA Method 8082.

c. Submit written documentation, which identifies the source, volume, and proposed transport date of the material for review and approval by Architect prior to importing the material.

d. A statement on company letterhead from the source, stamped by either a California Professional Geologist or Engineer, which states that the subject materials are native rock, do not contain any recycled materials and that the source does not mine ultramafic materials, a source of natural occurring asbestos shall be included in the submittal

E. Closeout Submittals

1.06 QUALITY ASSURANCE

A. Qualifications

1. All base course material and mixes shall comply with the "Greenbook", Standard Specifications for Public Works Construction, current edition, Part 2 – Construction Materials

B. Regulatory Requirements

1. Soil sterilization herbicide shall be approved for use under asphalt paving in the State of California per EPA Regulation No. 62719-107

C. Certifications

D. Field Samples

E. Mock-ups

F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling, and Unloading

1. In accordance with S.S.P.W.C., Section 300.

B. Acceptance at Site

C. Storage and Protection

D. Waste Management and Disposal

1.08 PROJECT CONDITIONS

1.09 SEQUENCING

1.10 SCHEDULING

1.11 WARRANTY

1.12 SYSTEM STARTUP

1.13 OWNER'S INSTRUCTIONS

1.14 COMMISSIONING

1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Soil Sterilization

1. Dow AgroSciences LLC, 9330 Zionsville Road, Indianapolis, IN 46268, or equal.

2.02 EXISTING PRODUCTS

2.03 MATERIALS

A. General

1. Materials indicated on Civil and/or Structural Drawings take precedence over materials listed below.

B. Sand (Where shown on drawings)
   1. S.S.P.W.C. Section 200-1.5.
   2. Not for use under asphalt paving.

C. Base Materials
   1. Caltrans Standard Specification, 26-1.02B Class 2 Aggregate Base.
   2. Crushed Aggregate Base (CAB), S.S.P.W.C. Section 200-2.2.

2.04 MANUFACTURED UNITS

2.05 EQUIPMENT

2.06 COMPONENTS

2.07 ACCESSORIES

A. Soil Sterilization
   1. (Dow AgroSciences) Spike 80DF

2.08 MIXES

2.09 FABRICATION

2.10 FINISHES

2.11 SOURCE QUALITY CONTROL

A. Tests, Inspection`
   1. Sampling and testing of imported and/or exported crushed miscellaneous base shall be performed in accordance with the following table:

Volume (Cubic Yards)	Sampling Frequency
0 to 500	1 per 100 Cubic Yards
501 to 1,000	1 per 250 Cubic Yards
1,001 to 5,000	1 per 250 Cubic Yards for 1st 1,000 Cubic Yards, 1 per 1,000 Cubic yards thereafter
5,001 to 20,000	12 samples for first 5,000 Cubic Yards, 1 per 1,000 Cubic Yards thereafter
Over 20,000	1 per 2,000 Cubic Yards for first 20,000 Cubic Yards, 1 per 2,500 Cubic Yards thereafter

   2. Base material shall be inspected by the Project Inspector of Record for gradation and material content prior to installation. The owner may choose to have additional tests performed by a geotechnical engineer, retained by the Owner, before installation.

B. Verification of Performance

PART 3 EXECUTION

3.01 INSTALLERS
3.02 EXAMINATION
3.03 PREPARATION
- A. Protection
- B. Surface Preparation
  - 1. Subgrade Preparation
    - a. In accordance with S.S.P.W.C., Section 301-1.
  - 2. Soil Sterilization
    - a. The installer shall take necessary precautions to prevent contamination of adjacent soil areas with herbicide and for the protection of personnel.
    - b. Herbicide shall not be applied within two feet of planting areas.

3.04 ERECTION
3.05 INSTALLATION
3.06 APPLICATION
- A. Soil Sterilization
  - 1. Apply at a rate of five (5) pounds per acre

3.07 CONSTRUCTION
- A. General
  - 1. Install in accordance with S.S.P.W.C., Section 300.
  - 2. Install material in layers not exceeding 4 inches in thickness, unless required otherwise. Grade and compact to Indicated levels or grades, cut and fill, water and roll until the surface is hard and true to line, grade and required section. Provide a relative compaction of at least 95 percent, unless otherwise required.
  - 3. Base material shall be of the thickness indicated on the plans upon final compaction.
  - 4. Grade base course to elevations indicated on Drawings, ready to receive surfacing.
  - 5. The finished surface shall be hard, uniform, and smooth and shall conform to the lines, grades, and cross section shown on the drawings.
- B. Sand
  - 1. Install in accordance with S.S.P.W.C., Section 301-2.
- C. Untreated Base Materials
  - 1. Install in accordance with S.S.P.W.C., Section 301-2.

3.08 REPAIR/RESTORATION
3.09 RE-INSTALLATION
3.10 FIELD QUALITY CONTROL
3.11 ADJUSTING
3.12 CLEANING
3.13 DEMONSTRATION
3.14 PROTECTION
3.15 SCHEDULES

END OF SECTION

SECTION 32 12 16
ASPHALT PAVING

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  - 1. Asphalt Paving
  - 2. Redwood headers
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
  - 1. 31 20 00 Earth Moving
  - 2. 31 23 26 Base Course
  - 2. 32 12 36 Seal Coats
  - 2. 32 13 13 Concrete Paving
  - 3. 32 17 23 Pavement Markings
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES
- A. The "Greenbook", Standard Specifications for Public Works Construction, current edition, (S.S.P.W.C.).
- B. Standard Specifications, State of California, California State Transportation Agency, Department of Transportation, current edition (Caltrans).
- C. ASTM D1188 -07(2015) Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS
- A. Design Requirements, Performance Requirements
  - 1. All specified construction materials and construction methods shall comply with the "Greenbook", Standard Specifications for Public Works Construction, current edition.

1.05 SUBMITTALS
- A. Product Data
  - 1. Submit manufacturers' technical data for materials and products
- B. Shop Drawings
  - 1. Submit scaled site plans indicating extent of paving, paving section, and accessories.
- C. Samples
- D. Quality Assurance/Control Submittals
  - 1. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, Qualification Statements
- E. Closeout Submittals

1.06 QUALITY ASSURANCE
- A. Qualifications
- B. Regulatory Requirements
  1. In accordance with Caltrans "Standard Specifications", Section 6-1.04 BUY AMERICA
- C. Certifications
- D. Field Samples
- E. Mock-ups
- F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING
- A. Packing, Shipping, Handling, and Unloading
  1. In accordance with S.S.P.W.C., Section 300.
- B. Acceptance at Site
  1. No greater amount of material shall be delivered in any one day than can be properly distributed and rolled during that day.
- C. Storage and Protection
- D. Waste Management and Disposal

1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS
2.02 EXISTING PRODUCTS
2.03 MATERIALS
- A. Asphalt Paving
  1. Provide materials of the class, grade, or type indicated on the Drawings, conforming to relevant provisions of Section 203 – Bituminous Materials of the "Greenbook", Standard Specifications For Public Works Construction, current edition
  2. Asphalt paving shall be produced by a commercial asphalt plant.

2.04 MANUFACTURED UNITS
2.05 EQUIPMENT
2.06 COMPONENTS
2.07 ACCESSORIES
- A. Concrete Headers
  1. See section 32 13 13 Concrete Paving
- B. Wood Headers
  1. Species: Redwood, Heart Grade
  2. Header Size:
     a. Straight: 2" x 6" nominal, unless otherwise noted
     b. Curved: 1" x 6" nominal, unless otherwise noted

C. Wood Stakes
1. Species: Redwood, Heart Grade
2. Stake Size: 2" x 4" nominal, unless otherwise noted

D. Nails
1. Min. 12d galvanized common

2.08 MIXES

A. General
1. Mix designs indicated on Civil Drawings take precedence over design listed below.

B. Asphalt Paving
1. Glass and Grade: III-C3 ½"-PG-64-10

2.09 FABRICATION

2.10 FINISHES

2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.01 INSTALLERS

3.02 EXAMINATION

A. Site Verification of Conditions
1. Do not install bituminous surfacing when atmospheric temperature is below 40 degrees F; or when fog or other unsuitable weather conditions are present.
2. Temperature of mixture at time of installation shall not be lower than 260 degrees F in warm weather or higher than 320 degrees F in cold weather.

3.03 PREPARATION

A. Protection
1. Provide adequate protection for concrete, planting areas, and other finish Work adjacent to areas indicated to receive bituminous surfacing.
2. Adjacent Work damaged or broken by the installers operations shall be repaired or replaced promptly by the installer responsible for the damage.

B. Surface Preparation
1. Initial preparation of subgrade shall be as specified in Section 31 20 00 Earth Moving.
2. If a time lapse has occurred between initial preparation of subgrade and paving operations, the subgrade shall then be scarified to a depth of at least 6 inches, moistened, and the entire area thoroughly compacted by rolling to obtain a smooth, hard, even surface of 90% compaction to receive the mineral aggregate base. The subgrade shall be finished to the required grades with due allowance being made for the thickness of base course and finished surfacing to be placed thereon.
3. Subgrade for the pavement structure shall not vary more than plus or minus 0.04 feet from the specified grade and cross section.
4. Areas inaccessible to power rolling or areas that cannot be compacted properly with power rollers, shall be compacted with

vibrating compactors or other suitable mechanical means which will produce a firm foundation for the paving structure.

3.04 ERECTION

3.05 INSTALLATION

3.06 APPLICATION

3.07 CONSTRUCTION

A. General

1. Install in accordance with S.S.P.W.C., Section 302.

B. Headers

1. Install headers along edge of bituminous surfacing abutting turf, earth, or planting area, unless indicated otherwise.
2. Install headers so the bottom surface has continuous bearing on solid grade. Where excavation for headers is undercut, thoroughly tamp soil under the header. Compact backfill on both sides of header to the density of adjacent undisturbed earth.
3. Where wood headers are indicated on drawings, fasten headers in place stakes of length necessary to extend into solid grade a minimum of 18 inches. Stakes shall be of sound material, neatly pointed, driven vertically, and securely nailed to headers. Space stakes, not to exceed 3 feet on center with top of stakes set ½-inch below top of header. Provide a minimum of two nails through each stake.
4. Remove existing headers where new surfacing is installed adjacent to existing surfacing.
5. Install temporary headers at transverse joints of paving where continuous paving operations are not maintained.
6. Provide additional stakes and anchorage as required to fasten headers in place.

C. Asphalt Paving

1. Thickness of Surfacing
   a. As indicated on drawings
   b. Asphalt paving shall be evenly spaced over the base course to such a depth that, after rolling, it will be of the specified cross section and grade of the course being constructed.
2. Surfaces of walls, concrete, masonry, or existing bituminous surfacing indicated to be in direct contact with new installed bituminous surfacing shall be cleaned, dried and uniformly coated with an asphaltic emulsion film.
3. Thicken edges of bituminous surfacing that do not abut walls, concrete, or masonry, and edges joining existing bituminous surfaces. Remove headers at existing bituminous surfacing where new bituminous surfacing is to be installed. Thicken edges an additional 2 inches and taper to the indicated or specified thickness 6 inches back from such edges.
4. Where 2-inch or 3-inch thick surfacing is specified, install surfacing in one course. Where surfacing is specified 4 inches or more in thickness, except for thickened edges, install bituminous surfacing in courses of approximately equal thickness, each course not exceeding 2 ½ inches in thickness.
5. Stakes or Screeds

a. Provide grade or screed stakes spaced not more than 15 feet apart in flow lines with grades of less than one percent.
b. Continuous screeds may be provided instead of stakes.

6. Spreading
   a. Install bituminous surfacing in a manner to cause least possible handling of mixture.
   b. In open areas and wherever practicable, install by mechanical means with a self-propelled mechanical spreader.
   c. In confined or restricted areas, install mixture with hot shovels and rakes, and smooth with lutes.
   d. Spreading, once commenced, must be continued without interruption.
7. Joints
   a. Provide vertical joints between successive runs.
   b. Install joints true to line, grade, and cross section.
   c. Lapped joints are not permitted.
8. Rolling
   a. Finish roll with a self-propelled tandem roller weighing at least 8 tons. Break down roll with a self-propelled roller weighing between 1-½ tons and 8 tons.
   b. Roll in a manner that preserves flow lines and the established finished grades. Break down roll in areas adjacent to flow lines parallel to flow lines. Break down roll after bituminous surfacing is installed without shoving or cracking of mixture under roller. Continue finish rolling until surfacing is unyielding, true to grade, and meets requirements for specified smoothness. Areas inaccessible to finish roller may be finish rolled with breakdown roller or tamped with hot tamping irons and smoothed with hot smoothing irons or hand roller.
   c. All rollers must be maintained in good mechanical condition, and those that cannot be operated without jerking, or driven along a straight path, shall not be used. No leakage of petroleum products from any roller shall be allowed to come in contact with the pavements being constructed, nor shall any roller be permitted to stand motionless on any portion of the work before it has been properly compacted. Rolling surfaces shall be treated with water to prevent the adherence of the asphalt paving, but the quantity used must not be such as to be detrimental to the surface being rolled.
   d. Where bituminous surfacing abuts concrete, masonry, walks or paving, tamp joint smooth, if necessary, as described above to obtain a uniformly even joint, true to line and grade. Tamp and smooth to properly compact.
   e. Compacted bituminous surfacing shall be provided with a bulk specific gravity of at least 2.31 when tested in accordance with ASTM D1188.

D. Site tolerances
   1. Smoothness

a. Surface of asphalt paving after rolling, shall be even, smooth and uniform in texture with no voids or rock pockets, free of roller marks or other irregularities, and not varying by more than 0.03 foot, except at local depressions or raised areas as indicated, when a 10-foot straightedge is placed on surface.

2. Grade

a. Finished grade shall not vary more than 0.02 foot above or below required grade. Variations within prescribed tolerance shall be compensating so that average grade and cross-section are provided.

E. Surface sealing

a. After bituminous surfacing has passed flood test, clear and allow to dry and provide one more coat of surface seal as specified in section 32 12 36 Seal Coats.

b. Where indicated, provide multiple coats of surface seal to existing bituminous surfacing.

c. Where new bituminous surfacing joins existing bituminous surfacing, overlap surface seal a minimum of 12 inches onto existing bituminous surfacing.

3.08 REPAIR/RESTORATION

3.09 RE-INSTALLATION

3.10 FIELD QUALITY CONTROL

A. Site Tests, Inspection

1. After first coat of surface seal has been installed and after a 24-hour period, a flood test shall be completed of the bituminous surfacing in presence of the Project Inspector.
2. Flooding shall be done by water tank truck.
3. Repair areas of standing water or puddles and flood test locally; Install surface seal and retest as necessary.
4. The edges of the repair fill shall be feathered and smoothed so that the joint between the fill and the original surfacing is invisible.

3.11 ADJUSTING

3.12 CLEANING

A. The contractor shall clean up the paved areas prior to acceptance of the work. All dirt, spoil, and debris of any nature shall be removed, and the entire site shall present a clean, workman like appearance. Any damage to paint work from paving or seal coating operations shall be corrected.

3.13 DEMONSTRATION

3.14 PROTECTION

A. Protect the Work of this section until Substantial Completion

3.15 SCHEDULES

END OF SECTION

SECTION 32 12 36
SEAL COATS

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes
  - 1. Seal coat over asphalt paving.
- B. Products Supplied But Not Installed Under This Section
- C. Products Installed But Not Supplied Under This Section
- D. Related Sections
  - 1. 32 12 16 Asphalt Paving
  - 2. 32 17 23 Pavement Markings
- E. Allowances
- F. Unit Prices
- G. Measurement Procedures
- H. Payment Procedures
- I. Alternates

1.02 REFERENCES
- A. The "Greenbook", Standard Specifications for Public Works Construction, current edition, (S.S.P.W.C.).
- B. Standard Specifications, State of California, California State Transportation Agency, Department of Transportation, current edition (Caltrans).

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS
- A. Design Requirements, Performance Requirements
  - 1. All specified construction materials and construction methods shall comply with the "Greenbook", Standard Specifications for Public Works Construction, current edition.

1.05 SUBMITTALS
- A. Product Data
  - 1. Submit manufacturers' product information and application procedures.
- B. Shop Drawings
- C. Samples
- D. Quality Assurance/Control Submittals
  - 1. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, Qualification Statements
- E. Closeout Submittals

1.06 QUALITY ASSURANCE
- A. Qualifications
- B. Regulatory Requirements
  - 1. In accordance with Caltrans "Standard Specifications", Section 6-1.04 BUY AMERICA
- C. Certifications
- D. Field Samples
- E. Mock-ups

F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING
1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE
A. Extra Materials
1. Provide ten (10) gallons of material in labeled, unopened containers.
B. Maintenance Service

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. GuardTop L.L.C., Three Monarch Bay Plaza, Suite 210, Monarch Beach, CA 92629, or equal.
B. Reed & Graham, Inc., 690 Sunol St., San Jose, CA 95126

2.02 EXISTING PRODUCTS
2.03 MATERIALS
A. (GuardTop) Seal Coat
B. (Reed & Graham) Over Kote

2.04 MANUFACTURED UNITS
2.05 EQUIPMENT
2.06 COMPONENTS
2.07 ACCESSORIES
2.08 MIXES
2.09 FABRICATION
2.10 FINISHES
2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.01 INSTALLERS
3.02 EXAMINATION
A. Site Verification of Conditions
1. Seal coat shall not be applied in temperatures below 55 degrees F.
2. Material shall not be applied within 48 hours of forecasted rain, as rain may affect curing of asphalt seal coat products.

3.03 PREPARATION
A. Protection
1. Surface protection shall conform to manufacturers recommend procedures
B. Surface Preparation

1. If ambient temperatures exceed 100 degrees F, extra care should be taken in preparing the surface.
2. Surface preparation shall conform to manufacturers' recommend procedures.

3.04 ERECTION

3.05 INSTALLATION

3.06 APPLICATION

A. General

1. Install in accordance with S.S.P.W.C., Section 302.

B. Application Rates

SURFACE	NO. of COATS	RATE
Smooth Dense Pavement	2	25 to 30 gallons per 1,000 sf
Medium Surface	2	30 to 35 gallons per 1,000 sf
Rough, Aged Surface	3	45 gallons per 1,000 sf
Excessively Rough Surfaces	3 Min.	Consult Manufacturer's Representative

C. First Coat

1. Just prior to applying the first coat, mist the surface with water.
2. Apply seal coat using a truck mounted tank, wheeled container, or can.
3. Spread in continuous parallel lines by means of rubber-faced squeegees or by broom. This process can be completed by hand or by machine.
4. All tools should be misted wet before use to avoid product adhesion.
5. After material has been applied to the surface, spread by pulling the material toward the operator in a manner that will eliminate all ridges and air pockets.
6. Excessively rough areas
   a. For the first coat add 3 pounds of 30 mesh sand to each gallon of seal coat and 1/10 gallon of Hard Base Emulsion. Apply as a normal first coat. Then apply two additional coats of material without the sand additive to the surface.
7. Flood Test

D. Second Coat

1. Install only after surface has passed flood test.
2. After the first coat has completely dried, re-mist the surface with water, check to see that the surface is clean and free of all debris and apply the second coat using the same application process as the first coat.

E. Third Coat

1. If a third coat is required repeat the steps for second Coat.

F. Drying Time

1. Seal coat shall be allowed to dry a minimum of 24 hours before any traffic is permitted.
2. When asphalt is cold, in shade or the air temperature is below 75 degrees F drying time may need to be extended.

3.07 CONSTRUCTION
3.08 REPAIR/RESTORATION
3.09 RE-INSTALLATION
3.10 FIELD QUALITY CONTROL
3.11 ADJUSTING
3.12 CLEANING
3.13 DEMONSTRATION
3.14 PROTECTION
3.15 SCHEDULES

END OF SECTION

SECTION 32 13 13
CONCRETE PAVING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Portland Cement Concrete for:
      a. Surface Improvements
      b. Site Cast Sewer and Storm Drainage Facilities
      c. Reinforced Structures
      d. Miscellaneous Site Elements
   2. Reinforcing
   3. Concrete Construction Joint Filler
   4. Field-Molded Concrete Paving Joint Sealant
   5. Concrete curing compounds

B. Products Supplied But Not Installed Under This Section

C. Products Installed But Not Supplied Under This Section

D. Related Sections
   1. 03 10 00 Concrete Forming and Accessories
   2. 03 24 00 Synthetic Fiber Reinforcement
   3. 31 23 26 Base Course
   4. 32 12 16 Asphalt Paving
   5. 33 11 00 Water Utility Distribution Piping

E. Allowances

F. Unit Prices

G. Measurement Procedures

H. Payment Procedures

I. Alternates

1.02 REFERENCES

A. ACI 318-14: Building Code Requirements for Structural Concrete and Commentary

B. ASTM C33 Standard Specification for Concrete Aggregates

C. ASTM C150 Standard Specification for Portland Cement

D. ASTM C979 Standard Specification for Pigments for Integrally Colored Concrete

E. ASTM C1602 Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete

F. The “Greenbook” Standard Specifications for Public Works Construction, S.S.P.W.C. latest edition.

G. ASTM C309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

1.03 DEFINITIONS

1.04 SYSTEM DESCRIPTIONS

1. All specified construction materials and construction methods shall comply with the "Greenbook", Standard Specifications for Public Works Construction, current edition.
2. Concrete shall meet the design criteria as indicated on the civil drawings.
3. Concrete shall be mixed, placed, and cured in accordance with Referenced Standards (1.02 References) and project specifications.
4. The slab-on-grade is not designed to support traffic from cranes or other heavy construction vehicles. Contractor shall repair or replace damaged concrete slabs.

1.05 SUBMITTALS

A. Product Data
   1. Submit manufacturer's product data for admixtures used.
   2. Submit manufacturer's product data for chemical curing compounds used.

B. Shop Drawings
   1. Provide Shop Drawings identifying control and expansion joint layouts. Control and expansion joint layout shall identify on-center dimensions, aspect ratio, and area totals for all panels.
   2. Submit drawings indicating locations of reinforcing, embedded items, drains, posts, and all relevant interfacing work required for Contractor's coordination with other trades.
   3. Shop Drawings shall be newly prepared content and shall be drawn to scale. Contract Documents will not be accepted as Contractor's Shop Drawings. Re-purposing, super-imposing, and/or redacting Contract Documents will not be accepted as Contractor's Shop Drawings.

C. Samples
   1. When coloring admixtures are specified, submit 3-inch x 3-inch concrete sample of each specified color.

D. Quality Assurance/Control Submittals
   1. Submit mix design in accordance with the "Greenbook" Standard Specifications for Public Works Construction, Section 201 – Concrete, Mortar, and Related Materials.
   2. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, Qualification Statements
      a. All mix designs, reports, qualifications shall indicate concrete production facility.
      b. All mix designs, reports, qualifications shall be stamped and signed by a State of California Registered Professional Civil Engineer
      c. Submit the following for each mix design specified:
         1. Statement of Mix Design for Concrete
         2. Indicate cementitious materials, aggregates, and admixtures.
         3. Aggregate gradations.
         4. Compressive Report
         5. Shrinkage Report

6. Mix Design Qualification
d. Submit the material standards conformances:
1. Portland Cement: ASTM C150
2. Normal Weight Concrete Aggregates: ASTM C33
3. Light Weight Concrete Aggregates: ASTM C330
4. Curing Materials: ASTM C171
5. Water: ASTM C1602

E. Closeout Submittals
1. Not required.

1.06 QUALITY ASSURANCE

A. Qualifications
1. Provide adequate numbers of skilled personnel who are thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.

B. Regulatory Requirements
1. Portland cement concrete paving shall be stable, firm, and slip resistant and shall comply with **CBC Sections 11B-302 and 11B-403.**
2. Ground surfaces on accessible routes, clear floor or ground spaces, and turning spaces for play areas shall comply with **CBC Section 11B-1008.2.6** as follows:
a. Ground surfaces shall be inspected and maintained regularly and frequently to ensure continued compliance with ASTM F 1951.
b. Ground surfaces located within use zones shall comply with ASTM F 1292.

C. Certifications

D. Field Samples
1. Provide on-site sample panels approximately 5-feet x 5-feet for each specified finish. Construct additional panels as may be necessary to gain acceptance of finishes desired. After rejection of any panel, remove from site immediately. Accepted and reviewed panel is to be left in place at site for project duration as a project standard.

E. Mock-ups

F. Pre-installation Meetings
1. The pre-installation meeting shall include the following representatives: Owner's Representative, Contractor, Architect, Construction Manager, and any other individuals requested by the Owner or Architect.
2. The pre-installation meeting shall follow ACI 302.1R requirements and recommendations for agenda items outlined in section 1.1.2 Preconstruction meeting.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling, and Unloading
1. Not Applicable

B. Acceptance at Site
1. Not Applicable

C. Storage and Protection
1. Storage of materials shall be in accordance with ACI 318, 26.5.1.1

D. Waste Management and Disposal
1. Comply with Local, State, and Federal Laws.

1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS
2.02 EXISTING PRODUCTS
2.03 MATERIALS
A. Base Course
1. See Section 31 23 26 Base Course
B. Reinforcement
1. Reinforcing Steel, See Section 03 20 00 Concrete Reinforcing
2. Synthetic Fiber, See Section 03 24 00 Synthetic Fiber Reinforcement
C. Cement
1. In accordance with S.S.P.W.C., Section 201-1.2.1
2. ASTM C150 - Portland Cement, Type II/V
D. Aggregates
1. Aggregates found to be potentially reactive shall not be used.
2. In accordance with S.S.P.W.C., Section 201-1.2.2
3. Normal Weight Concrete (NWC): ASTM C33
E. Water
1. In accordance with S.S.P.W.C., Section 201-1.2.3.
2. Water used in mixing, curing, and cleaning concrete shall conform to ASTM C1602.
F. Chemical Admixtures
1. Use as required and only with the written acceptance of the Architect and Civil Engineer.
2. Chemical admixtures shall be in accordance with S.S.P.W.C., Section 201-1.2.4.
3. Coloring admixtures shall be in conformance with ASTM C979
a. Job-proportioning or job-mixing of material for monolithic colored surfaces is not permitted.
b. Shall be lime-proof and contain no calcium chloride.
c. Color: As selected by Architect.
G. Concrete Curing Materials
1. Spray-Applied Membrane Curing Compounds
a. In accordance with S.S.P.W.C., Section 201-4.1.
c. For integrally colored concrete, curing compound shall pigmented to match coloring admixture.

2.04 MANUFACTURED UNITS
2.05 EQUIPMENT
2.06 COMPONENTS

2.07 ACCESSORIES

A. Forming and Accessories
   1. See Section 03 10 00 Concrete Forming and Accessories

B. Concrete Construction Joint Filler
   1. (Cellotex) Flexcell Expansion Joint Filler, ½-inch thick.
   2. (Homasote) Homex 300 Expansion Joint Filler, ½-inch thick.
   3. (W.R. Meadows) Fibre Expansion Joint, ½-inch thick.

C. Field-Molded Concrete Paving Joint Sealant
   1. (Tremco) Vulkem 445SSL, Field-Tintable, Semi-Self-Leveling, Multi-Component, Polyurethane Sealant
      a. Color as selected by Architect
   2. (DAP) DAP 3.0, Self-Leveling Concrete & Masonry High Performance Sealant
      a. Color as selected by Architect
   3. (W.R. Meadows) Pourthane SL, Self-Leveling Polyurethane Sealant
      a. Color as selected by Architect

2.08 MIXES

A. General
   1. Mix designs indicated on Civil and/or Structural Drawings take precedence over mix design listed below.

B. Surface Improvements
   1. Concrete Pavement (not integral with curb)
      a. S.S.P.W.C., Concrete Class 650-CW-4000
   2. Curb, Integral Curb and Pavement, Gutter, Walk, Alley Aprons
      a. S.S.P.W.C., Concrete Class 650-CW-4000
   3. Extruded Curb, Curb and Gutter
      a. S.S.P.W.C., Concrete Class 650-CW-4000

C. Sewer and Storm Drainage Facilities
   1. Pipe Collars, Beam Support for Pipe, Pre-Cast Manhole Components, Catch Basins, Sidewalks Culverts
      a. S.S.P.W.C., Concrete Class 650-CW-4000
   2. Pipe Bedding and Encasement, Anchors and Thrust Blocks, Wall Support for Pipe
      a. S.S.P.W.C., Concrete Class 650-CW-4000

D. Reinforced Structures
   1. See Structural Drawings

E. Miscellaneous
   1. Street Light and Traffic Signal Foundations, Survey Monuments
      1. See Structural Drawings
   2. Fence, Gate, and Guardrail Post Foundations
      1. See Structural Drawings
   3. Concrete Not Otherwise Specified
      1. S.S.P.W.C., Concrete Class 650-CW-4000

2.09 FABRICATION
2.10 FINISHES
- A. Broom Finish
  - 1. Light Broom Finish
    - a. Walks and pavement surfaces sloped between 0.00% and 1.99%
    - b. Gutters, 3-inch wide steel trowel finish at flow lines
  - 2. Medium Broom Finish
    - a. Walks and pavement surfaces sloped between 2.00% and 5.99%, texture perpendicular to direction of traffic
    - b. Stair treads and landings
    - c. Onsite drive aprons
  - 3. Heavy Broom Finish
    - a. Walks and pavement surfaces sloped between 6.00% and 8.33%, texture perpendicular to direction of traffic

2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION

2.01 INSTALLERS
3.02 EXAMINATION
3.03 PREPARATION
- A. Protection
- B. Surface Preparation
  - 1. In accordance with S.S.P.W.C., Section 302.
  - 2. In accordance with S.S.P.W.C., Section 303.

3.04 ERECTION
3.05 INSTALLATION
3.06 APPLICATION
- A. General
  - 1. In accordance with S.S.P.W.C., Section 302.
  - 2. In accordance with S.S.P.W.C., Section 303.
- B. Concrete Curing Application
  - 1. In accordance with S.S.P.W.C., Section 201-4.1.2

3.07 CONSTRUCTION
- A. General
  - 1. In accordance with S.S.P.W.C., Section 302.
  - 2. In accordance with S.S.P.W.C., Section 303.
- B. Formwork
  - 1. In accordance with S.S.P.W.C., Section 302-6.2
  - 2. See Section 03 10 00 Concrete Forming and Accessories
- C. Mixing
  - 1. In accordance with S.S.P.W.C., Section 201-1.4
- D. Placing
  - 1. In accordance with S.S.P.W.C., Section 303-1.8

E. Curing
   1. In accordance with S.S.P.W.C., Section 302-6.6
   2. No concrete curing compounds shall be used on tennis court paving.
F. Adverse Weather Requirements
   1. In accordance with S.S.P.W.C., Section 303-1.8.8
H. Formwork Removal
   1. In accordance with ACI 318, 26.11.2.1
I. Embedment's
   1. In accordance with ACI 318, 20.7, 26.8
J. Construction Joints
   1. In accordance with S.S.P.W.C., Section 303-1.8.6, 303-1.8.7
   2. In accordance with Construction Documents.
   3. Construction Joints shall be spaced no greater than 20'-0" on center in any direction.
   4. Control Joints shall be spaced no greater than 10'-0" on center in any direction.
   5. Soft-Cut joints as detailed on drawings
K. Finishing
   1. In accordance with S.S.P.W.C., Section 302-6.4
   2. In accordance with S.S.P.W.C., Section 303-1.9

3.08 REPAIR/RESTORATION
3.09 RE-INSTALLATION
3.10 FIELD QUALITY CONTROL
A. Site Tests, Inspection
   1. All concrete gutters and concrete pavement shall be given a flood test in the presence of the Project Inspector (PI).
   2. All concrete work where water ponds and does not run off in a reasonable amount of time, shall be removed to the nearest joint line and replaced to provide proper drainage.

3.11 ADJUSTING
3.12 CLEANING
A. Remove rubbish, debris, and waste materials and legally dispose of off the project site.

3.13 DEMONSTRATION
3.14 PROTECTION

3.15 SCHEDULES

A. Concrete Paving Finish

1. Light Broom Finish
   a. Walks and pavement surfaces sloped between 0.00% and 1.99%
   b. Gutters, 3-inch wide steel trowel finish at flow lines
2. Medium Broom Finish
   a. Walks and pavement surfaces sloped between 2.00% and 5.99%, texture perpendicular to direction of traffic
   b. Stair treads and landings
   c. Onsite drive aprons
3. Heavy Broom Finish
   a. Walks and pavement surfaces sloped between 6.00% and 8.33%, texture perpendicular to direction of traffic

END OF SECTION

SECTION 32 31 13
CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Materials and installation methods for chain link fences and gates
      a. Galvanized steel coated chain link fabric
      b. Galvanized steel framework and fittings
      c. Galvanized steel gates

B. Products Supplied But Not Installed Under This Section

C. Products Installed But Not Supplied Under This Section

D. Related Sections
   1. 09 97 13 Steel Coatings
   2. 32 13 13 Concrete Paving

E. Allowances

F. Unit Prices

G. Measurement Procedures

H. Payment Procedures

I. Alternates

1.02 REFERENCES

A. ASTM A392 Specification for Zinc-Coated Steel Chain-Link Fence Fabric

B. ASTM A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

C. ASTM A824 Specification for Metallic-Coated Steel Marcelled Tension Wire for Use With Chain Link

D. ASTM F552 Standard Terminology Relating to Chain Link Fencing

E. ASTM F567 Standard Practice for Installation of Chain Link Fence

F. ASTM F626 Specification for Fence Fittings

G. ASTM F900 Specification for Industrial and Commercial Swing Gates

H. ASTM F1043 Specification for Strength and Protective Coatings of Metal Industrial Chain Link Fence Framework

I. ASTM F1083 Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures

J. CLFMI WLG2445 Chain Link Fence Wind Load Guide for the Selection of Line Post and Line Post Spacing

K. UL 325 Door, Drapery, Gate, Louver and Window Operators

L. The “Greenbook” Standard Specifications For Public Works Construction, Latest Edition

1.03 DEFINITIONS

A. Chain Link Fabric: A fencing material consisting of wire helically wound and
P interwoven in such manner as to provide a continuous mesh without knots or ties except in the form of knuckling or twisting at the top and bottom of the mesh to from the fabric selvage.

B. Selvage: The top and bottom edge finish on woven chain link formed by joining adjacent pairs of wire pickets. The selvage may be knuckled or twisted.

C. Knuckled Selvage: Refers to bending the adjacent pairs of wire back into a tight loop.

D. Twisted Selvage: Refers to twisting the adjacent pairs of wire together in a close helix of 1-1/2 machine turns, which is equivalent to three full twists.

E. Mesh Size: The minimum clear distance between the wires forming the parallel sides of the mesh.

F. Terminal Post: A post to which the chain link fabric is terminated using specific fittings; end post, corner post, gate post, and pull post.

G. Pull Post: A terminal post used to accommodate a grade or placed at intervals on long stretches of fence.

H. Line Post: Intermediate posts set no greater than 10 feet on center between the terminal posts.

1.04 SYSTEM DESCRIPTIONS

1.05 SUBMITTALS

A. Product Data
   1. Submit manufacturers' product data for products specified.

B. Shop Drawings
   1. Submit a scaled site plan showing layout of fence location with dimensions, location of gates and opening size, cleared area, elevation of fence and gates, detail of attachments and footings.
   2. Submit a scaled elevation for each gate assembly indicating all gate hardware and total gate leaf weight.

C. Samples
   1. Submit samples from manufacturers' full range of colors for products specified.

D. Quality Assurance/Control Submittals
   1. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, Qualification Statements
      a. Submit manufacturers' material certifications in compliance with current ASTM specifications.
      b. Submit manufacturers' certification of active membership with the Chain Link Manufacturers Institute.
      c. Submit material certifications, made in U.S.A., Buy American Act or Buy America when required.

E. Closeout Submittals

1.06 QUALITY ASSURANCE

A. Qualifications
   1. Manufacturer: Company operating in the United States having U.S. manufacturing facility/facilities specializing in manufacturing chain link fence products with at least 5-years' experience.
   2. Manufacturer shall be an active member of the Chain Link Fence Manufacturers Institute.
   3. Fence contractor: Company with demonstrated successful experience installing similar projects and products in accordance with ASTM F567 and have at least 5-years' experience.

B. Regulatory Requirements
   1. Gates that are of the accessible routes, clear floor or ground spaces, and turning spaces for play areas shall comply with **CBC Section 11B-404**.
   2. The lever of lever actuated latches or locks for an accessible gate shall be curved with a return to within ½-inch of the (face of) gate to prevent catching on the clothing or persons. **California Referenced Standards code. T-24 Part 12, Section 12-10-202, Item (F)**.
   3. Swing doors and gate surfaces within 10-inches of the finish floor or ground shall have a smooth surface on the push side extending the full width of the door or gate. Parts creating horizontal or vertical joints in these surfaces shall be within 1/16-inch of the same plane as the other and be free of sharp or abrasive edges. Cavities created by added kick plates shall be caped. **CBC Section 11B-404.2.10**.

C. Certifications

D. Field Samples

E. Mock-ups

F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling, and Unloading
   1. Deliver products to site per contract documents

B. Acceptance at Site

C. Storage and Protection
   1. Store and protect products off the ground

D. Waste Management and Disposal

1.08 PROJECT CONDITIONS

1.09 SEQUENCING

1.10 SCHEDULING

1.11 WARRANTY

1.12 SYSTEM STARTUP

1.13 OWNER'S INSTRUCTIONS

1.14 COMMISSIONING

1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Chain Link Fence and Gates

1. Any active member of the Chain Link Manufacturers Institute

B. Privacy Slats

1. PrivacyLink, P.O. Box 295, Hyde park, Utah 84318 or equal.
2. Pexco, 2500 Northwinds Pkwy, Suite #472, Alpharetta, GA 30009

2.02 EXISTING PRODUCTS

2.03 MATERIALS

A. Zinc Coated Chain Link Fence and Gates

1. Steel Fabric
   a. ASTM A392 and ASTM A817, galvanized before weaving (GBW)
   b. Type II, Class 4 Min. 1.2 oz/sf of zinc coating, 15-Year Warranty
   c. Mesh Size: 2”
   d. Gauge: 9
   e. Height: See drawings
   f. Selvage: K&K (Knuckle Top & Bottom)
2. Steel Fence Framework and Gate Posts
   a. Pipe Diameter: See drawings
   b. Round Steel Pipe and Rails: ASTM F1043 Group IA, Regular Strength Grade, 30,000 psi yield, Schedule 40 galvanized pipe per ASTM F1083 unless noted otherwise on drawings.
   c. Coating: Hot-Dip Galvanize process
3. Tension Wire
   a. Core Wire Gauge: 7 gauge marcelled steel wire complying with ASTM A824
   b. Coating: Type II Zinc-Coated Class 5 – 2.0 oz/sf
4. Fittings
   a. Tension and Brace Bands
      1. Galvanized pressed steel complying with ASTM F626, minimum steel thickness of 12 gauge, minimum width of ¾-inch and minimum zinc coating of 1.20 oz/sf.
      2. Bands supplied with 5/16-inch or 3/8-inch galvanized steel carriage bolts.
   b. Terminal Post Caps, Line Post Loop Tops, Rail and Brace Ends, Rail Sleeves
      1. In compliance with ASTM F626, pressed steel galvanized after fabrication having a minimum thickness zinc coating of 1.20 oz/sf.
   c. Truss Rod Assembly
      1. In compliance with ASTM F626, 3/8” diameter steel truss rod with a pressed steel tightener, minimum

zinc coating of 1.2 oz/sf, assembly capable of withstanding a tension of 2,000 lbs.

d. Tension Bars
   1. In compliance with ASTM F626, Galvanized steel one-piece length 2-inches less than the fabric height, minimum zinc coating 1.2 oz/sf
   2. Bars for 2-inch mesh shall have a minimum cross section of 3/16-inch by ¾-inch.
   3. Bars for 1-inch mesh shall have a minimum cross section of 1/4-inch by 3/8-inch

5. Tie Wire and Hog Rings
   a. Tie wire and hog rings per ASTM F626
   b. 6-gauge aluminum alloy ties
   c. 6-gauge aluminum alloy hog rings
6. Gates
   a. Size: See Drawings
   b. Galvanized steel welded fabrication in compliance with ASTM F900.
   c. Gate Frame Members: ASTM F1043 Group IA, Regular Strength Grade, 30,000 psi yield, Schedule 40 galvanized pipe per ASTM F1083 unless noted otherwise on drawings.
   d. Welded joints protected by applying zinc-rich paint in accordance with ASTM Practice A780. See 09 97 13 Steel Coatings.
   e. Fabric: Match fence fabric
   f. Hinges: See Drawings
   g. Latch/Lever: See Drawings
   h. Additional Hardware: See Drawings

2.04 MANUFACTURED UNITS

2.05 EQUIPMENT

2.06 COMPONENTS

2.07 ACCESSORIES

A. Concrete
   1. See 32 13 13 Concrete Paving

B. Privacy Slats
   1. (PrivacyLink) Bottom Locking Double Wall Slats
      a. Height: Match height of fence
      b. Color: As selected by Architect from manufacturer's standard color options
   2. (Pexco) Bottom-Lock
      a. Height: Match height of fence
      b. Color: As selected by Architect from manufacturer's standard color options

2.08 MIXES
2.09 FABRICATION
2.10 FINISHES
2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.01 INSTALLERS
3.02 EXAMINATION
3.03 PREPARATION
- A. Protection
- B. Surface Preparation
  1. Surveying, clearing, grubbing, grading and removal of debris for the fence line or any required clear areas adjacent to the fence not included in the earthwork contractor's contract is the responsibility of the fence contractor in accordance with the provisions of 'The "Greenbook" Standard Specifications For Public Works Construction', Latest Edition, Part 3 – Construction Methods and ASTM F567, current edition.

3.04 ERECTION
3.05 INSTALLATION
- A. Framework
  1. Posts
     a. Posts shall be set plumb in concrete footings in accordance with ASTM F567.
     b. Minimum footing depth, 24-inches plus an additional 3-inches for each 1-foot increase in the fence height over 4-feet unless noted otherwise on drawings.
     c. Minimum footing diameter four times the largest cross section of the post up to 4.00-inch O.D. and three times the largest cross section of post greater than 4.00-inch. O.D., unless noted otherwise on drawings.
     d. Minimum gate posts footings per ASTM F567 unless noted otherwise on drawings.
     e. Top of post concrete footing to be 6-inches below finish grade unless detailed otherwise on drawings.
  2. Top rail
     a. Install 21 ft. lengths of rail continuous thru the line post or barb arm loop top, unless detail otherwise.
     b. Splice rail using top rail sleeves minimum 6 in. long.
     c. The rail shall be secured to the terminal post by a brace band and rail end.
     d. Bottom rail and intermediate rail shall be field cut and secured to the line posts using rail ends and brace bands. Boulevard bands will shall not be permitted.

3. Terminal posts
    a. End, corner, pull and gate posts shall be braced and trussed for fence 6 ft. and higher.
    b. The horizontal brace rail and diagonal truss rod shall be installed in accordance with ASTM F567.
4. Tension wire (When detailed on drawings)
    a. Shall be installed 4-inches up from the bottom of the fabric.
    b. Fences without top rail shall have a tension wire installed 4-inches down from the top of the fabric.
    c. Tension wire to be stretched taut, independently and prior to the fabric, between the terminal posts and secured to the terminal post using a brace band.
    d. Secure the tension wire to the chain link fabric with 9-gauge hog rings 18-inches on center and to each line post with a tie wire.

B. Chain Link Fabric
1. Chain Link Fabric
    a. Install fabric to outside of the framework.
    b. Attach fabric to the terminal post by threading the tension bar through the fabric
    c. Secure the tension bar to the terminal post with tension bands and carriage bolts spaced no greater than 12-inches on center.
    d. Chain link fabric to be stretched taut free of sag.
    e. Fabric to be secured to line post, top rail, intermediate rail, and bottom rail with tie wires spaced no greater than 12-inches on center to posts and spaced no greater than 18-inches on center to rails with aluminum alloy wire ties. Ties shall be wrapped around the post or rails and attached to a fabric wire picket on each side of the post or rail by twisting the tie wire around the fabric wire picket two full turns per ASTM F567.
    f. Secure fabric to the tension wire with hog rings spaced no greater than 18 inches on center.
    g. Excess wire shall be cut off and bent over to prevent injury.
    h. Installed fabric shall have a ground clearance of no more than 2-inches.

C. Swing Gates
1. Install gates and gate posts in compliance with ASTM F567.
2. Gates shall be plumb in the closed position.
3. Gates shall have a bottom clearance of 3-inches in the closed position, unless detailed otherwise on the drawings.
4. Hinge and latch offset opening space from the gate frame to the post shall be no greater than 3-inches in the closed position.
5. Double gate drop bar receivers shall be set in a concrete footing minimum 6-inches diameter by 24-inches deep.

D. Horizontal Slide Gates
   1. Install in accordance with ASTM F567
   2. Gates shall be plum in the closed position.
   3. Gates 48-inches and smaller in clear opening width shall be installed to slide with an initial pull force no greater than 5 lbs.
   4. Gates larger than 48-inches in clear opening width shall be installed to slide with an initial pull force no greater than 40 lbs.

E. Nuts and Bolts
   1. Carriage bolts used for fittings shall be installed with the head on the secure side of the fence.
   2. All bolts shall be tack-welded to prevent removal of the nut.

F. Privacy Slats
   1. Install per manufacturer's installation instructions.

3.06 APPLICATION
3.07 CONSTRUCTION
3.08 REPAIR/RESTORATION
3.09 RE-INSTALLATION
3.10 FIELD QUALITY CONTROL
3.11 ADJUSTING
3.12 CLEANING

A. The area of the fence shall be left neat and free of any debris caused by the installation of the fence.

3.13 DEMONSTRATION
3.14 PROTECTION
3.15 SCHEDULES

END OF SECTION

SECTION 32 84 00
LANDSCAPE IRRIGATION SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:
The work of this Section shall conform to the “GREENBOOK Standard Specifications for Public Works Construction," latest edition, Section 212, except as modified herein.

1.02 SCOPE OF WORK:
Work of this Section includes the removal and re-installation of controllers, irrigation master valves and flow sensors and irrigation mainlines, furnishing, adjusting, installing and testing of mains, laterals, risers and fittings, quick couplers, shut-off valves, sprinklers and emission devices, excavation and backfill, and all other work in accordance with the plans and specifications for a complete operating system. All work shall be in accordance with applicable City and County codes, and these plans/specifications.

1.03 RELATED WORK DESCRIBED ELSEWHERE:

A.	Planting:	Section 32 93 00
B.	General Commissioning Requirements	Section 01 91 13

1.04 STANDARDS:
Materials and workmanship shall conform to the requirements of all applicable regulations and codes, except that requirements specified herein shall govern where they are greater. Refer and comply with the provisions of the following codes, specifications and standards, except as otherwise shown or specified:

A. National Electrical Code.

B. Electrical Safety Orders of the State of California, Division of Industrial Safety.

1.05 QUALITY ASSURANCE:

A. Conform to the requirements of the reference information listed below except where more stringent requirements are shown or specified in the most current set of construction documents: –

1. American Society for Testing Material (ASTM), for test methods specifically referenced in this section.
2. Underwriter's Laboratories (UL), for UL wires and cables.
3. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
4. Comply with requirements of local Water Purveyor for preventing backflow and back siphonage.
5. Comply with ASTM F 645, "Guide for Selection, Design, and Installation of Thermoplastic Water Pressure Piping Systems.”
6. Comply with NFPA 70, "National Electrical Code," for electrical connections between wiring and electrically operated devices.

7. Furnish plastic pipe and fittings permanently marked with size, class, and type of pipe, working pressure at 73.4 degrees F, and National Sanitation Foundation (NSF) rating.

B. The Contractor shall maintain, continuously, a competent superintendent or foreman, who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of materials being installed and the materials manufacturer's recommended methods of installation, and who shall direct all work performed under this Section. The superintendent shall be authorized to represent the Contractor.

C. Prior to commencement of work, contractor shall verify drawing dimensions with actual field conditions, and exact location of irrigation water meter - point of connection provided by others. Verify existing pressure at point of connection, coordinate location and installation of new main line. Immediately report to the Landscape Architect and/or District Representative all conditions, which prevent proper execution of this work.

D. All assemblies specified herein shall be installed in accordance with the respective details. In the absence of detail Drawings or specifications pertaining to the specific items required to complete the work, the Contractor shall perform such work in accordance with the best standard practice and to the satisfaction of the Landscape Architect.

E. Irrigation Contractor is responsible for replacing or repairing any acts of theft or vandalism during construction and the landscape maintenance period.

F. The Contractor shall obtain and pay for all permits and inspections required by outside agencies.

G. Code Requirements shall be those of State and Municipal Codes and Regulations locally governing this work, providing that any requirements of the Drawings and Specifications, not conflicting therewith but exceeding the Code Requirements shall govern, unless written permission to the contrary is granted by the Architect.

H. Due to the scale of Drawings, it is not possible to indicate all offsets, fittings, sleeves, etc., which may be required. Carefully investigate the structural and finished conditions affecting all of this work and plan this 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. The work shall be installed in such a manner as to avoid conflicts between irrigation systems, planting, and architectural features.

I. Work noted as “NIC.” (Not In Contract) is not part of this section.

J. Permission to shut off any irrigation lines must be obtained from the District Representative. Disruption of existing systems and services shall be kept to a minimum. Water shall not be turned off for a period longer than 48 hours which supplies plant material to remain and be protected in place, or contractor shall hand water material at contractor’s expense.

1.06 SUBMITTALS:

A. Product Data: Within five (5) days after award of the Contract, and before any materials of this Section have been delivered to the job site, submit to the Landscape Architect:

(1) A complete materials list of all items proposed to be furnished and installed under this Section-6 including but not limited to supplier, and cut sheets, colored copies spiral bound unless otherwise noted. PDF's emailed to all parties shall be accepted with prior approval by construction management/design team.

(2) The manufacturer's recommended methods of installation which, when recommended for approval by the Landscape Architect, shall become the basis for review and accepting or rejecting actual installation methods used on the work when not otherwise specified or detailed.

B. Materials and Samples: The Contractor shall, prior to the installation of any irrigation work, submit for recommended approval by the Landscape Architect a list of materials and equipment he proposes to use. The material and equipment list shall include, but not be limited to, polyvinyl chloride pipe, control valves, irrigation heads, quick coupler valves, backflow preventers, and controllers.

(1) Should the Contractor propose to use materials or equipment other than those listed on the plans, he shall submit samples of the make and type proposed. Samples shall be submitted a sufficient time in advance of the start of construction to allow a period of not less than seven (7) days for testing and recommended approval. Substitution of any product, material, or equipment without prior, written, recommended approval will not be permitted.

C. Manufacturer's warranties: Shall not relieve the Contractor of his liability under the guarantee. Such warranties shall only supplement the guarantee.

1.07 PRODUCT HANDLING:

A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the work and materials of all other trades.

B. Delivery: Polyvinyl chloride pipe shall be delivered to the work site in unbroken bundles or rolls packaged in such a manner as to provide adequate protection for the pipe ends, threaded or plain.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the recommended approval of the Landscape Architect and at no additional cost to the District.

1.08 EQUIPMENT TO BE FURNISHED:

A. Supply as a part of this contract the following:

(1) Two sets of wrenches for disassembling and adjusting of each type of head installed.

(2) One operating key shall be furnished for each five (or less) gate valves installed.

(3) Two quick coupler keys with matching swivels with globe valves.

(4) Two individually bound "Operating and Maintenance Manuals" detailing operation and maintenance requirements for irrigation systems. Include descriptions of all installed materials and systems in sufficient detail to permit maintenance personnel to understand, operate and maintain the equipment.

Provide the following in each manual:

a. Index sheet, stating Irrigation Contractor's name, address, telephone number and name of person to contact.

b. Duration of guarantee period, including all manufacturer's guarantees or warranties.

c. Equipment list providing the following for each item:

Manufacturer's name.
Make and model numbers.
Name and address of local manufacturer's representative
Spare parts list in detail.
Detailed operating and maintenance instructions for major equipment.

B. The above-mentioned items shall be turned over to the district at the conclusion of the project, prior to final payment.

C. In addition to the above-mentioned maintenance manuals, provide the district's maintenance personnel with instructions for major equipment and show evidence in writing to the Landscape Architect at the conclusion of the project that this service has been provided.

D. Project Record Drawings: Provide separate and complete Project Record Drawings prepared in accordance with the provisions of Sub-section 3.14, following.

1.09 GUARANTEE:

The irrigation system shall be guaranteed for a period of one (1) year following formal issuance of substantial completion by District and Landscape Architect, in accordance with Sub-section 3.20, following.

PART 2 - MATERIALS

2.01 GENERAL:
All materials shall conform to Section 212 of the "Standard Specifications,"

2.02 PIPE:
Manufacture from virgin polyvinyl chloride compound in accord with ASTM 1785, 2241, 2672 or 3139.; hydrostatic design stress rating not less than 2,000 psi.

A. Pressure Supply Lines (Mainline):
1. Pressure Supply Line (Mainline) shall be determined as follows: 1" thru 1 ½" shall be Schedule 40, solvent weld ASTM D1785 & D2665.
2. 2" to 3" shall be SDR13.5 (Class 315) solvent weld ASTM D22441
3. 4" and larger shall be bell and gasketed pipe SDR21 (class 200) by JM Eagle model Ring-Tite Joint or approved equal. All fittings shall be Leemco self-restrained joint fittings. Contractor shall install thrust blocks at every bend and change in direction, including under Leemco joint restraints.
4. All 2"-3" pressure supply lines shall have thrust blocks. All ends, corners, etc. on mainline.

B. Non-pressure Lateral Lines:
1. Non-Pressure Lateral Lines: (downstream of electric remote-control valve) 3/4" to 1-1/2" shall be PVC Schedule 40, conforming to ASTM D1785-83.
2. Non-Pressure Lateral Lines: (downstream of electric remote-control valve) 2" to 4" shall be PVC SDR31.5 (Class 315) solvent weld, conforming to ASTM D22441
3. Fittings: Standard weight, Schedule 40, injection molded PVC, complying with ASTM D1784 and D2466, cell classification 12454-B.
    a. Threads- Injection molded type (where required).
    b. Tees and Ells-side gated.
    c. Threaded Nipples: ASTM D2464, Schedule 80 with molded threads.
    d. Joint Cement and Primer: Type as recommended by manufacturer of pipe and fittings.

C. All pipe shall be continuously marked with: Manufacturers name, nominal size, PVC type, pressure rating, SDR, NSF seal, and date of extrusion.

D. Seamless copper water tube, ACT B88, Type "L", drawn temper per Irrigation Booster installation, Type "K" for all other applications.

E. Brass screwed pipe shall be red brass conforming to Federal Specification #WW-P-351.

F. All pressure supply lines under vehicular paving to be installed with a PVC Schedule 40 sleeve, the sleeve shall be a minimum of twice the irrigation line

diameter and shall extend a minimum of twelve inches (12") beyond such pavement. All other Irrigation Lines Sleeve or Low Voltage Control Wire Sleeves shall be PVC Schedule 40 polyvinyl chloride.

G. Pipe manufactured more than two years before installation not permitted. All pipe shall have been protected for sun exposure during storage and installation.

H. Pipe which shows any sign that it has not been protected from exposure to sun at any time shall is not permitted.

2.03 FITTINGS:

A. Pressure Supply Line:

1. Fittings for Mainline pipe 1”-3” shall be Schedule 80 PVC Solvent Weld ASTM D 2464.
2. Fittings for Mainline Pipe size 4” and larger shall be ductile iron, slanted, deep bell, gasket style made in accordance with ASTM A-536, Grade 65-45-12 & AWWA C153. self-restrained fittings as manufactured shall be as manufactured by Leemco, Inc.

C. Reducer tees will be used in cases of pipe size reduction. Bushing will only be allowed in cases of reduction where such a reducer tee is not manufactured.

D. Rigid PVC Nipples: ASTM D1785, Schedule 80, Type 1, molded threads.

E. Schedule 40 PVC street ells.

F. Brass: Red brass conforming to Federal Specification #WW-P-351. Schedule 40 threaded nipple stock, tees, ells, and unions.

G. Copper - Wrought solder-joints.

H. Cast Copper Flange Fittings conforming to ASTM B584/ANSI B16.18, max pressure rating: 300psi, Temp range-100 degree to 250 degree.

I. Ductile Iron Flanged Fittings: ASTM A536-ANSI/AWWA C 110/A21.10, UL and FM requirements, pressure rating 250 psi rating for 1”-48” sizes and 150psi rating for 54” – 64”

2.04 FITTING CONNECTION:

A. Solvent Cement: ASTM D2564 for PVC Pipe and fittings.

B. Use heavy body cement for Sch 80 fittings. Follow ASTM procedures for all pipe welding and installation. Use Teflon Tape at all fittings.

C. PVC Primer and Glue: Use in all cases as recommended by pipe and fittings manufacturer, including both pressure supply lines and non-pressure Lateral lines.

1. IPS Weld -On P - 70 primer

2. IPS Weld -On 711 (gray) cement

D. PVC to metal joints shall be made with PVC Schedule 80 threaded fittings into galvanize with female adapter to PVC pipe. The PVC fitting shall be hand tightened, plus one turn with strap wrench. Joint compound shall be IPS weld on Teflon pipe joint compound or equal.

E. Metal-to-Metal joints: graphite and oil lubricant or Teflon paste on male threads only.

2.05 SLEEVES AND CONDUIT: For use under paving and hardscape as sleeves for irrigation pipe and conduit for control wire shall be schedule 40 PVC.

A. Only standard lengths of pipe shall be used. Couple and weld only when length required is longer than a standard manufactured length.

B. See details for specifications of installation and as outlined by pipe manufacturer.

2.06 GALVANIZED PIPE AND FITTINGS:

A. All galvanized steel pipe shall be Schedule 40, threaded, coupled and hot-dip galvanized, and shall comply with ASTM A120 and A53.

B. All fittings for galvanized steel pipe shall be 150 psi rated galvanized malleable iron, banded pattern.

C. Pipe sizes indicated on the Drawings are nominal inside diameter unless otherwise noted.

2.07 COPPER PIPE AND FITTINGS:

A. Pipe: Type K, hard tempered.

B. Fittings: Wrought copper, solder joint type.

C. Joints shall be soldered with silver solder, 45% silver, 15% copper, 16% zinc, 24% cadmium, solidus at 1125 Degrees F. and liquidus at 1145 Degrees F.

2.08 BRASS PIPE AND FITTINGS:

A. Brass pipe shall be 85% red brass, American National Standard Institute (ANSI), Schedule 40 screwed pipe.

B. Fitting shall be medium brass, screwed 125-pound class.

2.09 ISOLATION VALVES/ SHUT-OFF VALVES (GATE VALVES & BALL VALVES):

A. Isolation Ball Valve for used prior to valve manifolds on mainline pipe 2” and smaller in size: Bronze, full port, threaded connection valve as manufactured by NIBCO model T-585-70, or equal.

B. Isolation Ball Valve for use on mainline pipe smaller than 2” in size, Bronze, full port, threaded connection valve as manufactured by NIBCO model T-585-70, or equal.

C. Isolation Gate Valve for use on mainline pipe 2-1/2” and larger: Iron bolted bonnet with 2” square operating nut, non-rising stem, resilient wedge type, soft seat, flanged end epoxy coated, bronze trimmed iron body as manufactured by NIBCO model F-619-RW-SON flanged, or equal.

2.10 MASTER VALVE: (EXISTING TO REMAIN TO BE RELOCATED AS INDICATED ON PLANS)

A. Refer to Irrigation Plan Legend for Model Number. Maximum working pressure:
1. Manual Electric -235 psi
2. Pressure Reducing Manual Electric- 140 psi

B. Body: Cast iron, epoxy coated

C. Valve diaphragm: Reinforced natural rubber.

D. Connections:
1. National pipe thread
2. Flanged, drilled to ANSI Specifications.

F. Standards: EEC approved (Class A)

2.11 FLOW SENSING WIRING:(EXISTING TO REMAIN TO BE RELOCATED AS INDICATED ON PLANS)

A. The flow sensor wire shall be a two conductor of ICEA class B, 16 AWG 7 strand, conforming to ASTM B-3 and B-8, aluminum shield with drain wire, and shall have a jacket of 0.50 sunlight and moisture resistant PVC as manufactured by Paige Electric, Inc. (product #P7162D).

B. Flow sensor wire may be extended to a maximum distance of 2,000 feet from the location of the assembly to which it is connected. Wire shall be installed in a 1 1/4" PVC Schedule 40 pipe.

C. All conductors shall be the same type and shall be of the sizes shown on the drawings as required for proper operation of the systems.

2.12 FLOW SENSOR:(EXISTING TO REMAIN TO BE RELOCATED AS INDICATED ON PLANS)

A. The Model FM flow meter shall use two #14 AWG; one red, and one black in 1" PVC conduit to connect to the irrigation controller. The maximum wire run between flow meter and controller shall be 2000 ft. The flow meter shall send low voltage digital pulses back to the controller and therefore all electrical connections must be waterproof and shall resist any moisture entry.
B. It is intended that all wire runs between the controller and flow meter shall be direct pulls and shall have no splices. If wire splices are unavoidable, they shall be installed in a valve box with Spears DS-100 connectors with Spears sealant or 3M Scotchlok No. 3570 connector sealing pack used, with valve boxes properly labeled.
C. Each flow meter shall have the following characteristics: 1.Housing to be a bronze tee 2.Have a pulsing output that operates at 9VDC and a pulse rate that is proportionate to the GPM 3.Fully compatible with the internal interface at each field controller 4.Powered by the controller 5.Replaceable metering insert shall feature a six-bladed design with a proprietary, non-magnetic sensing mechanism 6.Supplied by the same manufacturer as the irrigation controller.
D. Several controllers, up to twelve shall be able to share one or multiple points of connection with multiple flow sensors when each controller has been specified with the –FL (*FLOWSENSE*™) option. This option shall allow several controllers to share the irrigation programs and flow information for:
    - Monitoring of system flows.
    - Shortening water windows by maximizing the number of valves on without exceeding system flow capacity.
    - Turning OFF valves with excessive flow rates due to broken lateral lines.
    - Tracking water usage and comparing to a water budget.
    - Eliminating relays when sharing pumps and master valves.
    - Working in the field without the need for a central computer.

E. The communication method between controllers specified with the –FL (*FLOWSENSE*™) option shall be either hardwire cable or spread spectrum radio. The hardwire cable shall be a 4-conductor communication cable known as Paige P-7171-D in conduit. The controllers shall be specified with the –M communication option. The radio link shall be spread spectrum and the controllers shall be specified with the –SR communication option when hardwire is not feasible or cost effective. This allows the user to link several controllers with unlicensed frequency hopping radios. A radio survey conducted by the manufacturer is required prior to installation to confirm proper communication.

F. The hardwire and radio link options for the *FLOWSENSE*™ option shall be mixed on a project to create the most efficient system possible.

G. A field controller shall be able to interface and read up to three flow meters varying in size when the controller is specified as a –F option.

2.14 BURIED PIPING WARNING/IDENTIFICATION TAPE AND LOCATOR TAPE:

A. Plastic warning/identification tape shall be an inert plastic film specially formulated for underground use. The minimum thickness shall be 4 mils.

B. Locator tape shall be installed over non-metallic pipe, shall be similar to warning tape, and shall include a metallic substance that can be registered by a magnetic field location device. Minimum thickness for locator tape shall be 5 mils. Locator tape shall be supplied by T. Christy Enterprises, Inc. or an approved equal.

See table below for tape widths:

PIPE SIZE	**TAPE WIDTH**
Over 12”	12”
8” Thru 12”	6”
4” Thru 6”	3”
1” Thru 3”	2”

2.15 SURGE PROTECTION:

A. All surge protection, grounding and installation of equipment specified, shall be installed in strict compliance with the manufacturer’s recommendations and in accordance with Local, State and Federal requirements.

1. Primary Power Surge Protection:
Furnish and install surge protection on the power circuit that will supply power to the Interface.

2. Field Surge Protection:

a. SP-100 surge protectors shall be installed at every line termination point. Additional SP-100’s shall be installed at every 600-foot interval along the two-wire path, located at the nearest line decoder. Connect SP-100 ground wires to a single 8-foot ground rod. If the valve is metallic or the solenoid has a metallic center pin, one of the SP-100 ground wires shall be connected to it.

b. All SP-100/ground rod assemblies shall be installed in valve boxes. Mark the location of all ground points on the as-built plans.

c. All grounds shall be tested for earth-to-ground resistance. Readings of 50 Ohms or less are acceptable. Resistance readings of 50 Ohms or greater shall necessitate the installation of additional grounding materials to reduce the ground resistance to acceptable levels.

2.13 AUTOMATIC CONTROLLER:(EXISTING TO BE RELOCATED AS INDICATED ON PLANS)

A. Controller(s) shall be as indicated on the drawings and shall be manufactured by WeatherTrak-OptFlow XR-upgradable to OptiFlow for advanced flow management and multi-controller automatic scheduling.

B. The Controller shall be installed per manufacturer's specifications, as shown on the drawings, and as specified herein. Include 6 years of cellular data with OptiFlow service.

C. The irrigation system controller shall be weather-based and self-adjusting to Evapotranspiration.

D. The controller shall operate on a 117 VAC "10% at 60 Hz and be capable of actuating up two 24 VAC, 7 VA, solenoids per station plus a master valve and pump start relay. The Controller output and input shall be protected against severe electrical surge by a 2.0-amp self-retting fuse. The Controller shall measure 14.5” L x 12.5” W x 4.75” D.

E. The controller shall communicate two ways – from the on-site controller(s) to a central web server and from the central web server to the on-site controller(s).

F. The controller shall have 16-48 stations in 8 station increments, each capable of operating single stations or all stations from 1-255 minutes in 1-minute increments. The minimum configuration shall be 16 stations.

G. The on-site controller(s) access shall include, but not limited to, land-line telephone Analog, wireless via the GSM network, and power-line through 110-volt power.

H. The central servers shall be located in two geographically different states of the United States to ensure backup protection against different common natural disasters that may occur in each of these regions.

I. The controller shall access local weather via the internet to a central server. The local weather source shall be monitored 24 hours a day, 7 days week.

J. The central server shall be capable of computing a custom schedule on a station-by-station basis for each controller using local weather and irrigation scheduling algorithms that are based on detailed landscape profile for each station. The landscape profile shall be entered via a web interface that enables the user to select six specific descriptive inputs for each station, including sprinkler or drip type, plant type, soil type, sun/shade condition, slope, and precipitation rate.

K. The custom schedule(s) shall be updated daily and communicated to the on-site controller(s).

L. Current detection - The controller will have the ability to detect if a valve solenoid is connected and current
is regular or if there is a current problem, either (1) not connected or burned open which has low current
reading or (2) a "short" condition which has a high current reading. The controller display panel will indicate OK (regular current), OC (open circuit - not connected) or

SH (short). The controller will do the current test each time the controller runs and if a problem is detected an "alert" will be sent via email. This feature may also be used to test valve solenoids at the time of installation.

L. Multiple Valve Operation in Manual Mode - The controller shall have multiple valve operation that will enable a manual test of multiple valves (e.g. stations 1 and 4 or stations 1, 4 and 6) at the time of install to determine if there is adequate pressure to run multiple valves at a time.

M. The on-site controller(s) will execute the schedule(s) in a water window that has been set on the web site.

N. Set-up, monitoring, adjustments will be accomplished from any PC via internet connection with the central server.

O. Standard connections for rain sensor, booster pump, master valve, and flow sensor. Compatible with normally open or normally closed master valves, rain/freeze, or wind sensors (users are notified via email when irrigation is blocked or restarted).

P. Optional flow monitoring service provides mainline break protection, individual station flow monitoring, and leak detection. Features include automatic shut-off in event of mainline break and email alerts for high flow, low flow, no flow, and leak conditions.

Q. The controller shall be capable of retrofitting into select controller brands without the need to re-wire the controller wires to field wires.

R. The controller shall be capable of learning flow parameters by valve through a 3-minute system test operation. The learned flow shall be accepted by user via internet-based access. The Controller shall have station output terminal sized for up to 12-gauge wire.

1. The Controller shall have a LCD display to provide output verification for station being irrigated.

2. The Controller shall include chassis-mounted grounding lug for added lightning protection.

3. The Controller shall include a built-in 120VAC convenience outlet for optional power line communication.

4. All 24VAC output terminals shall have surge protection rated up to 4KV in accordance with IEC 6100-4-5 standard.

5. All outputs shall be protected by a 2.0amp self-resetting fuse.

6. Input power draw shall be 1.0 amp or less at 120VAC.

7. Each valve station, master valve, and booster pump output terminal shall handle up to two 24VAC solenoids.

8. The total controller output shall be 2.0 amps and may operate four solenoids. including master valve and pump start relay.

9. The controller shall be supplied with three 1.5V batteries and has the capacity. to maintain time and date for several months.

10. The controller shall have non-volatile memory to retain all programming. information indefinitely.

11. The controller shall be capable of integrating an optional remote receiver. or connector.

2.16 INTERNET BASED FEATURES:

A. Weather-based watering schedules with ET and rain adjustments automatically generated on a daily basis for all stations.

B. The system shall include step-by-step configuration process enabling the system to generate customized watering schedule for each station to optimize water use and minimize runoff.

C. Daily display of both ET (evapotranspiration) and rain data. Water budget adjustable from 50% to 400% in 5% increments on a station-by-station basis.

2.17 IRRIGATION CONTROLLER ENCLOSURE: (EXISTING TO REMAIN TO BE RELOCATED AS INDICATED ON PLANS)

A. The irrigation system controllers, as specified, shall be assembled in a gasketed, weather-resistant 304 stainless steel packaged system pedestal enclosure, as specified on the plans and in the specifications.

B. The Packaged System shall include lightning surge protection mounted within, with separated wiring compartments for field wiring terminations and low voltage Controllers and circuit board components. Connection points for all valve wiring, sensor wiring, and two wire path connections shall be clearly labeled on all wiring connections and pre-wired to controller, providing the installer with a “plug & play” assembly.

C. A separate 120-volt power connection with on/off switch and a utility outlet to be included. The finished assembly will be UL listed and will have documentation verifying that the manufacturer has powered, tested, and verified its functionality.

D. Key lock protection to be provided. A five-year warranty will be provided, covering workmanship and all packaged system components.

2.18 CONTROL WIRE:

A. All control wire shall be of the Underwriter's Laboratory type UF (underground feeder), single conductor, solid copper, plastic insulated, 600 volts rated, for

direct burial applications. Maximum conductor operating temperature, 60 degrees C. for both wet and dry locations. Wire composition is as follows:

1) Conductor - the conductors shall be solid annealed uncoated copper meeting the applicable requirements of the latest revisions of ASTM B-3.

(2) Insulation - the insulation shall be colored plastic which meets the test requirements of I.P.C.E.A. (The Insulated Power Cable Engineer's Association) Pub. No. S-61-402, dated July 1961, Section 3.7 for 60 degrees C. polyvinyl chloride insulation. The insulation shall be flame retardant, resistant to fungus, resistant to corrosive fumes, suitable for wet locations and furnish some degree of inherent protection against mechanical abuse. Insulation thickness shall be 47 mils for AWG #14, #12 & #10, and 62 mils for AWG #8.

(3) Color Coding - The conductor insulation shall be color coded as follows:
   a. All common ground wire shall be white.

   b. All pilot (valve control) wire shall be black.

(4) Wire Connectors
   a. 3m DBY/R Direct Burial Splice Kit, shall splice and effectively moisture seal two or more conductors. The electrical connector shall be a Scotchlok Y. The device shall be installed according to the manufacturer's instructions and all applicable codes. The device shall be UL Listed as a Wire Connector System for Use with Underground Conductors.

(5) Wire Connections for direct burial shall be "one stop" waterproof wire connectors.

2.19 WIRE SPLICES:

A. Conductors shall be installed with no underground splices, unless necessary and unavoidable. All underground splices that are required to be made, must be approved by the Architect, and shall be placed in a suitable type valve box for easy access.

B. Wire splices on the two conductor cable communication wires shall be made with 3M DBY splice kit or approved equal.

C. Wire splices on the multi-conductor cable communication wires shall be made with Preformed Super Serviseal with Polybee sealant (product #8006039).

2.20 AUTOMATIC CONTROL VALVES (ELECTRIC):

A. All automatic control valves (electric) shall be globe or angle pattern, electrically controlled, hydraulically operated, single seat, normally closed.

B. The valves shall be actuated by a normally closed solenoid valve operator using 24 volts, 60 cycle alternating current. The wires in the coil of the solenoid shall

be embedded in an epoxy resin. The entire solenoid shall be enclosed in a watertight housing. Valves shall automatically close in event of electrical power failure.

C. All automatic control valves shall have a flow control device for manually adjusting the amount of flow of water through the valve. The flow control device shall be adjusted so that the pressure at the nozzle of the sprinkler head farthest from the automatic control valve shall be that as specified in the irrigation legend per plan. The pressure at the sprinkler head shall be measured by means of a pilot pressure gauge while the sprinkler head is operating.

D. Automatic control valves shall be as specified on the plans, Superior 950 Series or approved equal. Reference irrigation plan, detail, and legend for size and appropriate model number.

E. Tags: Christy's Standard Irrigation ID Tags.

2.21 VALVE BOXES

A. Standard Remote-Control Valve Boxes. The valve box shall be durable plastic: The cover shall be branded with letters "RCV" and include valve number designation stenciled two inches (2") high on the outside of the cover with lid cover.
   1. Rainbird Series Model VB-STD: Black Body and Green Lid- Standard rectangular with bolt-down cover.

B. Quick coupling valve boxes shall be round durable plastic: The cover shall be branded with the letters "QCV," two inches (2") high.
   1. Rainbird Series Model VB-10RND - 10" round with bolt-down cover.

C. Drip Valves:
   1. Rainbird Series Model(s) VB-JMB-H –Black Body and Green Lid with locking hex bolt with Model VB-JMB-B: Black Body only. Use body in conjunction with Model VB-JMB-H. The cover shall be branded with the letters "DV," two inches (2") high and include valve number designation.

D. Flush Valves valve boxes shall be round durable plastic:
   1. Rainbird Series Model VB-7RND. The cover shall be branded with the letters "FV," two inches (2") high.

E. Gate valve and ball valve boxes shall be durable plastic: The cover shall be identified with the letters "GV" or "BV", two inches (2") high stenciled on the outside of the cover.
   1. Railbird Series - Model VB-10RND 10" round with bolt-down cover.
   2. Traffic Boxes shall be concrete with traffic box/cast iron lid: Carson/ Brooks 4-TT 10 1/4" diameter marked Irrigation. Brooks 3 ½ (T) PB 10" x 17" pull box w/ full bolt down traffic cover marked "Irrigation". Locate in hardscape only.

F. Valve boxes located in hardscape areas shall be concrete with traffic rated bolt-down cast iron cover. The cover shall be identifiable with 2" high stenciled letters

on the outside cover marked “Irrigation”.

G. Use of valves boxes in hardscape shall require pre-approval from the District Representative and the Landscape Architect.

H. Traffic Boxes shall be concrete with traffic box/cast iron lid: Carson/ Brooks 4-TT 10 1/4" diameter marked Irrigation. Brooks 3 ½ (T) PB 10" x 17" pull box w/ full bolt down traffic cover marked “Irrigation”. Locate in hardscape only.

2.22 SPRAY AND ROTOR HEADS:

A. Pop-up Spray Type: Full or part circle pop-up spray type sprinkler body, stem, nozzle, and screen constructed of heavy-duty plastic. The sprinkler shall have a soft wiper seal for cleaning debris from pop-up stem as it retracts into case to prevent sprinkler from sticking up. The sprinkler shall have a matched precipitation rate plastic nozzle with an adjusting screw capable of regulating the radius and flow. The sprinkler shall have a strong stainless steel retract spring for positive pop down. Pop-up height shall be as indicated on plans. The sprinkler head shall have a screen under the nozzle to protect it from clogging and for easy removal for cleaning and flushing system. The sprinkler head shall have a bottom inlet and may have a side inlet for ease of installation. Use only the bottom inlet for sprinkler heads equipped with anti-drain devices. As Manufactured by Hunter Pro Series or approved equal.

B. Pop-up Rotary Type: Rotary sprinkler of the gear driven type. Nozzles shall be available for true matched precipitation rates:

1. The sprinkler shall be available in adjustable arc configuration. The adjustable arc sprinkler shall be adjustable from 40 degrees to 360 degrees in 1-degree increments. Adjustments shall be made from the top of the riser assembly in either the up or down position.
2. The pop-up sprinkler shall be of height as indicated on plans. Nozzle shall be integrally molded multiple orifice type that can be changed with tools included. Radius shall be adjustable by means of an exchangeable nozzle or a movable diffuser pin. Nozzle turret shall be molded with a service indentation to accept a tool for raising nozzle piston for service.
3. The sprinkler shall have a 3/4- or 1-inch NPT inlet and shall be accessible by a threaded cap for easy service.
4. The body of the sprinkler shall be constructed of non-corrosive heavy-duty ABS. The sprinkler shall be equipped with a filter screen for debris stoppage. The sprinkler shall also be available in shrub model with the same nozzle package. The sprinkler shall carry a 2-year unconditional warranty.
5. All sprinkler heads with similar functions shall be of common manufacture and, with the exception of shrubbery heads, shall be marked with the manufacturer's name and identification in a position where they may be identified without being removed from the system.

C. Swing Joint Assemblies:
1. Swing joint assemblies for pop-up spray type heads consisting of 1/2" inlets shall use two heavy-duty Marlex street ells, as manufactured by Spears – Model M412-XXX or equal, with a single schedule 40 PVC threaded ell and one schedule 80 nipples, lengths as listed in detail.
2. Swing joint assembly's pop-up rotary type sprinklers consisting of 3/4" and greater sprinkler inlets shall be pre-assembled, double O-ring, schedule 80 PVC. Swing joint as listed by KBI – Model TSA or equal.

2.23 BUBBLERS/ DRIP ASSEMBLIES:

A. Low Volume Emitters -Salco Pro-Spec Emitter or approved equal.
1. Internal Check Valve feature, model (PST-CV) includes positive internal spring to hold back 9.25' of elevated water.
2. ½" FIPT (PST) or ¼" barbed base (PS)
3. PC Flow: .05, 1, 2, or 4 gph.
4. Pressure range: 5-65 psi
5. Zone Filtration: 100 – 150 mesh

B. IH Series Riser:
1. Pre-assembled with two ½" MIPT UVR male adapters
2. Maximum Flow: 7 gpm
3. Maximum Pressure: 60 psi.

C. Netafim Techline Tubing:
1. 2 psi Check Valve in each emitter.
2. Pressure compensating features.
3. Continuous flushing emitter system.
4. Flexible tubing-bending radius: 7 inches.
5. Recommended minimum filtration: 120 mesh.
6. Post indicator stakes – Body with flag, Microtube SPE 3* 5mm, 90 cm length, start connector, and plastic stake (33 cm)

D. Refer to Irrigation Legend for model numbers and irrigation detail sheet.

2.24 PULL BOX:

A. All pull boxes shall be Brooks (concrete), or equal, for connection of conduit and route of communication and sensor cable. The pull box will have a cast iron lockable traffic lid.

PART 3 - EXECUTION

3.01 GENERAL:

All work shall conform to Section 308 of the "GREEN BOOK Standard Specifications FOR Public Works Construction" and except as modified herein. No work of this Section other than sleeving under pavement shall commence prior to the completion and acceptance of all grading work specified in Section 02910, Landscape Grading.

A. Prior to all work of this Section, carefully inspect existing site conditions and equipment. Verify available pressure at point of connection and location of water meter provided by the Water Department.

B. Verify that irrigation system may be installed in strict accordance with all pertinent codes and regulations, the original design, the reference standards, and the manufacturer's recommendations.

C. In the event of discrepancy, immediately notify the Landscape Architect. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

D. Trenches and other excavations for irrigation pipe and appurtenances shall be excavated true to alignment and grade and shall be of ample size for the proper performance of installation work, review, testing and backfill.

E. Protect all existing utilities and repair any damage to existing utilities with matching new materials, at no increase in contract price.

F. Generally, piping under concrete shall be installed by jacking, boring or hydraulic driving. Where any cutting or breaking of pavement, track sections and/or concrete work is necessary, it shall be removed and replaced by the Contractor. Permission to cut or break pavement, track sections and/or concrete shall be obtained from the district. No hydraulic driving will be permitted under asphalt concrete paving or track sections.

3.02 COMMISSIONING COORDINATION:

A. Provide technical services of the equipment manufacturer and the contractor to operate and adjust equipment specified under this section during the commissioning phase activities, which include startup and functional performance testing, and documentation elements. Refer to General Commissioning Requirements Section 01 91 13.

3.03 UTILITY SERVICES:

A. Contractor shall provide for connections existing electrical services at locations indicated on the drawing.

B. Contractor shall connect new mainline to water services at locations indicated on the civil engineer’s drawings.

3.04 LAYOUT:

A. All piping or equipment shown diagrammatically on drawing outside of planting areas shall be installed inside planting areas whenever possible.

B. Layout each sprinkler head and make any minor adjustments required due to differences between actual site conditions and the Drawings. Minor adjustments shall be maintained within the original design intent. Protect in place all existing trees and shrubs.

C. Layout each system using staking method as approved by District's Representative. Maintain and protect approved staking layout.

D. Where drip tubing (Netafim) Is specified and located on the plans, the contractor shall remove 6- inches of soil and placed the material nearby and amend per Planting Specifications 32 93 00. Lay out drip tubing on finish surface In straight lines as shown on details, cover tubing with amended topsoil/fill material.

3.05 TRENCHING AND BACKFILL:

A. Trenching:

(1) Minimum trench width shall be six inches (6").

(2) Minimum trench depth below bottom of pipe shall be two inches (2").

(3) Minimum cover shall be based on finished grades, unless otherwise noted on Drawings.

a. Non-Pressure Lateral Line cover shall be no more than twelve inches (12") and not less than eight inches (8").

b. Pressure Supply line (Mainline) minimum cover shall be Twenty-four inches (24") for lines two and one-half inches (2-1/2") and less; twenty-four inches (24") for lines two and one-half inches (2-1/2") and larger.

c. Pipe and Wire Sleeves minimum cover shall be twenty-four inches (24").

B. Backfill:

(1) All plastic pipe shall be bedded and encased with approved backfill material free of rocks and clods as indicated in the following table and/or shown on the plans.

Thickness Under Pipe Minimum	Thickness Above Pipe Minimum	Thickness at Side of Pipe Minimum
Two inches (2")	Four inches (4")	Two inches (2")

(2) Provide not less than four inches (4") clearance between each line and not less than six inches (6") clearance between line of other trades, unless otherwise noted.

(3) Do not install parallel lines directly over any other line.

(4) The balance of backfill material shall be approved soil. Unsuitable material, including clods and rocks over three fourths inch (3/4") in size, shall be removed from the premises and disposed of legally at no cost to the Owner.

(5) Backfill material shall be sufficiently compacted under and on each side of the pipe to provide support free of voids. Pipe joints shall remain exposed until the completion of pressure and leakage test, unless authorized by the Architect. The top six inches (6") of backfill shall be free of rocks over one inch (1"), subsoil, rubbish, and debris.

(6) The remainder of the backfill material shall contain no lumps or rocks larger than two and three fourths inches (2-3/4"), nor contain rubbish and debris.

(7) Backfill shall be tamped or puddled to the dry density of adjacent soil. Backfill within areas of structurally compacted soils shall be returned to the original relative density as before trenching.

3.06 INSTALLATION OF PIPE:

A. Unless otherwise specified, the construction of lateral lines and main lines shall include excavation and backfill, the furnishing, installing and testing of pipe, tube and fittings, the furnishing and installing of anchors, thrust blocks and location wire, the improvements, line flushing and testing, and all other work in accordance with the plans and specifications.

B. Polyvinyl chloride pipe shall be installed in such a manner so as to provide for expansion and contraction as recommended by the manufacturer.

C. All polyvinyl chloride pipe shall lay free in the trench with no induced strain. Where there is evidence of induced pipe strain, the Contractor shall be required to make pipe cuts and install angle fittings as necessary to eliminate the strain.

D. When a connection is plastic to metal, a female adapter shall be used. The metal nipple shall be hand-tightened, plus one turn with a strap wrench. Joint compound shall be IPS weld-on Teflon pipe joint compound or equal. (Plastic to galvanize coupling to galvanize nipple. Do not connect galvanize into plastic).

E. The Contractor will be required to remove and replace any fitting, which induces a torque strain to the pipe.

F. Polyvinyl chloride pipe shall be cut with a PVC pipe cutter, hand saw or hack saw with the assistance of a square and sawing vise or in a manner so as to ensure square ends. Burrs at cut ends shall be removed prior to installation so that a smooth unobstructed flow will be obtained.

G. All plastic-to-plastic joints shall be solvent-weld joints. Only the solvent recommended by the pipe manufacturer shall be used.

H. The solvent-weld joints shall be made in the following manner:
1. Thoroughly clean the mating pipe and fitting with a clean dry cloth.

2. Try the parts for fit. The parts should "dry-mate" between one-third (1/3) and two-thirds (2/3) the depth of the socket. If adequate insertion is not obtained, or bottoming occurs, try another part until a satisfactory "dry-fit" is obtained.

3. Apply a uniform coat of solvent to the outside of the pipe with a non-synthetic bristle brush.

4. Apply a uniform coat of solvent-weld to the fitting socket.

5. Reapply a light coat of solvent-weld to the pipe and quickly insert it into the fitting.

6. Give the pipe or fitting a quarter turn to ensure even distribution of the solvents and make sure that the pipe is inserted to the full depth of the fitting socket.

7. Hold in position for at least fifteen (15) seconds.

8. Wipe off excess solvent that appears at the outer shoulder of the fitting.

NOTE: *For PVC Type I, 1120-1220, pipe mating surface shall first be cleaned with the application of Methyl Isobutyl Ketone (MIBK) solvent. This cleaning shall be accomplished by applying MIBK solvent to the full mating surface area and wiping off with a clean cloth, repeating the process, if necessary, until no trace of shine remains (neither streaks nor spots). The use of commercial PVC solvent-cement thinners as a substitute of MIBK is not allowed.*

I. Pressure supply steel pipe and fittings: Assemble using red lead and boiled linseed oil paste or an approved equivalent. Brass and Galvanized threaded fittings shall be assembled with both Teflon tape and oil base compound to male threads only.

J. Provide concrete thrust blocks at each change of direction and at all terminal points of all rubber gasket piping. Block in accord with pipe manufacturer's instructions.

J. Provide thrust blocks at all changes of direction and reductions shall be mechanically retrained. Additional thrust blocks shall also be restrained as per manufacturer’s recommendations. Gate valves shall be treated as a dead end and shall be mechanically restrained for serviceability.

3.07 INSTALLATION OF PIPE UNDER EXISTING PAVING:

A. Piping under existing pavements may be installed by jacking, boring or by hydraulic driving, except as otherwise specified or directed.

B. All pipes under pavement surface to be installed a minimum of 24 inches below A.C. paving with 6-inch bedding and a 6-inch cover of sand backfill.

C. Secure Owner's permission prior to cutting or breaking existing pavements.

D. Make completely clean cuts using power saws at approved locations only.

E. Replace and restore all surfaces to original condition, including grade, landscaping, and paving
   1. Restoration work shall match the original work in every respect, including type, strength, texture and finish.
   2. Consult with Owner for approved methods of patching and/or replacing any damaged paving sections as a result form boring saw cutting or removal.

3.08 INSTALLATION OF PIPE UNDER NEW PAVED AREAS:

A. Coordinate installation of piping and wires under paved areas with other trades.

B. All pipes under pavement surface to be installed a minimum of 24 inches below A.C. paving with a 6-inch bedding and a 6-inch cover of sand backfills.

C. If the only piping installed is over 20 feet long, pressure testing is required for that section at the time of installation. Upon completion of piping installation, the entire system must be tested.

D. If wire under paved areas cannot be continuous, all splices shall be enclosed in an approved pull box.

3.09 INSTALLATION OF CONTROL WIRE:

A. Unless otherwise specified, the installation of control wire shall include excavation and backfill, the furnishing, installing and testing of the wires, the removal and/or restoration of existing improvements and all other work in accordance with the plans and specifications.

B. Unless otherwise specified all neutral (common ground) wire shall be AWG #12 and all pilot (valve control) wire shall be AWG #14.

C. At least one spare wire shall be installed from the controller clock to the most distant valve. When wire runs go in different directions from the controller clock, a separate spare wire shall be installed from the controller clock to the most distant valve in each different wire run direction.

D. Tape and bundle all control wires at ten feet (10') o.c. maximum; place wiring with eighteen inch (18") minimum cover. When wiring is placed in common trenches with piping, set wiring two inches (2") from any piping. Place control wire along side of pipe. Do not place over the pipe.

F. All wire splicing shall take place in the valve boxes and/or pull boxes. All splices shall be made with a mechanical connector encased in a self-curing epoxy resin that provides a permanent watertight connection. No underground splices will be allowed.

G. All direct burial control wires shall be identified as to their respective valve number and controller clock letter in all pull boxes and at all wire termination. Spare wires and "future valve" wires, if any, shall also be identified. Labels and tags shall be used for identification of areas which are not affected by moisture or temperatures between minus 30 degrees F. and plus 200 degrees F. The labels and tags shall be resistant to abrasion, dirt, grease, and chemicals used in lawn fertilizers and conditioners. The labels and tags shall be firmly attached to the wire in every case. The Contractor shall submit samples of the labels or tags to be used to the Architect for recommended approval, prior to the installation of the control wire. Examples of nomenclature of tags or labels are as follows:

Neutral (common ground) wire	="Neutral" Clock "A"
Pilot (valve control) wire	="A.V. #1." Clock "A"
Spare Wire	="Spare" Clock "A"

H. The final operating sequence of the remote-control valves, within each individual controller clock, shall be as called out in the drawings.

I. Testing:

(1) All direct burial control wire installed shall be tested in the following manner.

a. Before any backfill material is placed over the control wires in the trench, the wires shall be tested with a meter for insulation resistance. Minimum insulation resistance to ground shall be fifty (50) megohms. Any conductor not meeting this requirement shall be replaced.

b. After backfill encasement, the wires shall again be tested with a meter. The minimum acceptable insulation resistance to ground on this test shall be one (1) megohm. Any conductor not meeting this requirement shall be replaced.

3.10 INSTALLATION OF VALVES:

A. General: Unless otherwise specified, the installation of the valves shall include excavation and backfill, the furnishing, installing and testing of fittings and valves, the furnishing and installing of valve boxes and appurtenances, accessories, the removal and/or restoration of existing improvements and all other work in accordance with the plans and specifications.

(1) Fill area under valve box with a minimum of three (3) cubic feet of pea gravel before box is installed.

B. Shut-off Valves: Shut-off valves installed underground shall be housed in a suitable valve box. The gate valve hand wheel shall be removed from the stem of all valves installed underground. The wheel shall be replaced with an operating nut.

C. Quick Coupling Valves: Unless otherwise indicated, locate valves within twelve inches (12") of hardscape. Install it in designated valve box.

D. Automatic Control Valves: Automatic control valves shall be set upright and housed in designated valve box, with a hinged, lockable, top. The Contractor shall place Christy's Standard Valve Identification tags on each valve corresponding to its appropriate valve station number.

3.11 INSTALLATION OF SPRINKLER HEADS:

A. Unless otherwise specified, the installation of sprinkler heads shall include excavation and backfill, the furnishing, installing and testing of risers, fittings and heads, the furnishing and installing of cone shaped screens at base of each head, the removal and/or restoration of existing improvements and all other work shall be in accordance with the plans and specifications.

B. Flushing: All water lines shall be thoroughly out before heads are installed.

E. Location and arc of heads shall be adjusted, if required to eliminate any dry spots, over water or spillage on adjacent areas.

3.12 THRUST BLOCKS:

A. Thrust blocks shall be concrete 2000 psi at 28 days. They shall be placed so that sides subject to thrust or load are against undisturbed earth, and valves and fittings are serviceable after concrete has set. Contractor shall install thrust blocs at every bend and change in direction, including under leemco joint restraints.

3.13 INSTALLATION OF WARNING TAPE:

A. Warning tapes shall be installed directly on top of the pipe longitudinally and shall be centered. The warning tape shall be installed continuous for the entire length of the pipe and shall be fastened to each pipe length by plastic tape banded around the pipe with fasteners no more than 5 feet apart. Taping attached to the sections of pipe before laying in the trench shall have flaps sufficient for continuous coverage. All risers between the mainline and control valves shall be installed with warning tape.

3.14 RECORD DRAWINGS:

A. The Contractor shall provide and keep up to date on a daily basis, a complete record set of bond copies in black and white which shall be corrected daily and show every change from the original Drawings and specifications and the exact locations, sizes and kinds of equipment in red ink. Prints for this purpose may be obtained from the Owner. This set of Drawings shall be kept on the site and shall be used only as a record set. Architect shall review drawings prior to any planting.

B. In order to complete the record Drawings in a neat, legible manner, the contractor shall indicate the necessary changes on Mylar tracings procured from the Owner/Landscape Architect.

C. The contractor shall dimension from two (2) permanent points of reference, building corners, sidewalks, etc., the location of the following items:

1. Water meters.
2. Pump stations.
3. Connection to existing water lines.
4. Routing of pressure supply lines at every 100 feet along routing.
5. Backflow prevention devices.
6. Pressure regulators.
7. Flow sensors.
8. Master valves.
9. Fertilizer injectors.
10. Isolation gate valves.
11. Isolation ball valves.
12. Quick coupling devices.
13. Air release valves.
14. Electric control valves.
15. Check valves.
16. Field satellite units/controllers.
17. Grounding rods.
18. Control wire routing (if routed separately from pressure supply line).
19. Communication cable routing (if routed separately from pressure supply line).
20. Communication cable and control wire splices that are outside of control unit or field satellite unit.
21. Other equipment as directed by District.

D. Prior to scheduling a walk through for Substantial Completion, provide a record set of field drawings as described above to the district for review. After review, the district will return the set to the field foreman requesting further information or will notify that the record set of field drawings are complete. After approval from the district, a walk through for Substantial Completion may be scheduled.

D. Prior to scheduling the final walk through, the final set of irrigation record drawings shall be professionally drafted.

E. Contractor is responsible for delivering the final set of record drawings to the District prior to initiating the maintenance period.

3.15 CONTROLLER CHARTS:

A. Revise existing controller chart to reflect new valve sequencings, and station runtimes.

B. Provide in controller chart for each automatic controller installed.

(1) Chart may be a reproduction of the record drawing if the scale permits fitting the controller door. If photo reduction prints are required, keep reduction to maximum size possible to retain full legibility.

(2) Chart shall be black-line print of the actual system, showing the area covered by that controller.

C. Identify the area of coverage of each remote-control valve, using a distinctly different pastel color, drawn over the entire area of coverage.

D. Following approval of charts by Owner's representative, they shall be hermetically sealed between two layers of 20-mil thick plastic sheet.

E. Charts must be completed and approved prior to final review of irrigation system.

3.16 REVIEWS:

A. Normal Progress Reviews: Normal progress reviews shall be requested from the Architect at least forty-eight (48) hours in advance of any anticipated review. A review will be made by the Landscape Architect on each of the steps listed below. The Contractor will not be permitted to initiate the succeeding steps of work until he has received written approval to proceed by the inspector.

B. In no event shall the Contractor cover up or otherwise remove from view any work under this contract without prior approval. The Contractor, at his expense, shall open any work covered prior to review to view.

C. Unprepared Review Requests: In the event the Contractor requests review of work and said work is incomplete, the Contractor shall be responsible for review cost.

D. Completion: The work will be accepted, in writing, when the whole shall have been completed satisfactorily to the Owner. In judging the work, no allowance for deviation from the original plans and specifications will be made unless already approved by the Owner, in writing, at the proper times.

(1) Leave the entire installation in complete operating order, free from any and all defects in material, workmanship or finish, regardless of any discrepancies and/or omissions in plans or specifications.

(2) Remove from the site all debris and rubbish resulting from the work and leave the installation in clean condition.

3.18 GUARANTEE:

A. The installed irrigation system shall be guaranteed by the Contractor as to material and workmanship, including settling of backfilled areas below grade for a period of one (1) year following the date of final acceptance of the work.

B. The Contractor, as part of the work under his contract, shall make all adjustments without extra cost to the Owner, including the complete restoration of all damaged planting, paving, or other improvements of any kind.

C. Should any operational difficulties in connection with the sprinkler system develop within the specified guarantee period which in the opinion of the Owner may be due to inferior material and/or workmanship, said difficulties shall be immediately corrected by the Contractor to the satisfaction of the Owner at no additional cost to the Owner, including any and all other damage caused by such defects.

D. The Owner reserves the right to make temporary repairs during the guarantee period as necessary to keep systems in operating condition without voiding the Contractor's guarantee, nor relieving the Contractor of his responsibilities.

3.19 TURN OVER ITEMS:

A. Turn over items shall include quick coupler keys, and as built prints.

B. Refer to equipment to be furnished under spec section 1.08 for list of additional items.

3.20 MAINTENANCE:

A. Maintenance of irrigation system prior to job completion, and during the Landscape Maintenance period, shall be the responsibility of the Contractor including, but not limited to, the following:

(1) Cleaning of plugged irrigation heads.

(2) Irrigation heads adjustments.

(3) Volume of water being applied. (Coordinate with landscape maintenance).

(4) Programming of the controller. (Coordinate with landscape maintenance).

(5) Repairing leaking valves, etc.

(6) Any other problem areas, which occur after installation, are attributed to the irrigation system.

(7) Repair or replace equipment due to acts of vandalism, theft or pest damage.

(8) Lower all turf heads to final grades prior to final acceptance by District.

B. The contractor' responsibility for the irrigation of plant materials and the maintenance and repair of the irrigation system begins on the contract start date. The methods that are required to irrigate the grounds include automatic irrigation systems and hand or portable irrigation components. The contractor shall plan and adjust irrigation schedules for automatic, hand or portable irrigation system.

C. Sprinkler Heads: Irrigation includes watering of lawns, shrubs, trees, palms, ground cover and plants. Care shall be exercised by regulating the time and equipment to prevent wasting of water. Watering shall be done in a manner that will avoid erosion, run-off, or ponding due to excessive quantities or rate of application. Sprinkler heads shall be adjusted to prevent water spray on buildings and sidewalks. It shall be the contractor's responsibility to apply enough water to assure and maintain the health and vigor of all lawn, shrubs, trees, and planted areas.

D. Water Restrictions: The contractor shall be in compliance with Federal, State and local water agencies and authorities' directives. The District reserves the right to reduce or eliminate watering during water shortages. The contractor shall be held liable for fines imposed by Federal, State and/or local water agencies.

E. The contractor is responsible for required irrigation by any means during the periods of system breakdown.

F. Frequency of Services: Irrigation Maintenance shall be weekly. Automatic watering systems in the immediate area of pedestrian traffic shall be set to operate during the hours of 10:00 PM to 4:30 AM.

END OF SECTION 328400

SECTION 32 93 00
LANDSCAPE PLANTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

The provisions of the “GREENBOOK Standard Specifications for Public Works Construction," latest edition, including General and Supplementary Conditions and Division 1 Specification Sections, shall apply except as modified herein.

1.02 SCOPE:

Work of this Section includes all material, equipment, and labor necessary for and incidental to completing all Landscape Planting work as indicated on the Drawings, or as reasonably implied, or as designated herein, including, but not limited to, the following.

A. Carefully inspect the site and verify all existing conditions and dimensions prior to proceeding with any work under this contract.

B. Apply for all permits and pay for same.

C. Clear and remove from the site all construction debris, surface growth, or other undesirable material.

D. Fine grading of all planting areas and weed abatement.

E. Preparation of all planting holes.

F. Furnishing and installation of all plant materials including sod unless otherwise noted.

G. Furnishing and installation of all required planting backfill materials, top dressing, edging, topsoil, and miscellaneous materials.

H. Obtain an agronomic/ germination soil test after rough grading of the site is complete. Take a minimum of two (2) samples from the various planting area shown within the scope of work. Obtain an agronomic/germination soils test for any imported soil brought in to finish off or add to landscape areas on site. The contractor shall review the agronomic soils test results and recommendations and comply with its findings. **Sludge base amendments shall not be allowed. After the completion of the fine grading and the placement of the soil amendments per the initial agronomic soils report, the contractor shall obtain another agronomic soils report to verify all planting areas within the scope have been amended per the agronomic report.**

I. Provide (90) ninety continuous calendar days Maintenance Period.

J. Project clean up and de-weeding of all planting areas.

K. Provide one-year guarantee for all plant material.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

Section 328400 - Irrigation Systems
Section 311000 – Site Clearing.
Section 312000 – Earth Moving.

Section 334600 – Sub drainage.
Section 329443 – Tree Grates.

1.04 DEFINITIONS:

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Bare-Root Stock (Applies to Palms only): Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for type and size of plant required.

C. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

D. Finish Grade: Elevation of finished surface of planting soil (not top of mulch or thatch layer).

E. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

F. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

G. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

H. Planting Area: Areas to be planted.

I. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

J. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

K. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots, the area of transition between the root system and the stem or trunk.

L. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

M. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

N. Subsoil: All soil beneath the topsoil layer of the soil profile and typified by the lack of organic matter and soil organisms.

O. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in

1.05 QUALITY ASSURANCE:

The Contractor shall provide at least one person who shall be present at all times during execution of this portion of the work, who shall be thoroughly familiar with the type of materials being installed and the proper materials and methods for their installation, and who shall direct all work performed under this Section.

A. All plants and planting material shall meet or exceed the specifications of Federal, State and County laws requiring inspection for plant disease and insect control.

B. Nursery Qualifications: Company specializing in growing and cultivating the plants with three years documented experience and which is regularly inspected by the State Department of Agriculture.

C. Installer's Qualifications: Landscaping Work shall be performed by a single firm specializing in commercial landscaping.

D. Source Quality Control:
   1. General: Ship landscape materials with certificates on inspection required by governing authorities. Comply with regulations applicable to landscape materials.

   2. Do not make substitutions. If specified landscape materials are not obtainable, submit proof of non-availability to Landscape Architect or Owner together with propose plant substitution. For equivalent use of material as specified.

   3. Analysis and Standards: A Package standard product with manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Agriculture Chemists wherever applicable.

   4. Topsoil: Before delivery of topsoil, submit independent laboratory analysis of topsoil fill. Analysis shall indicate percentage of nitrogen, phosphorus, potash; soluable salts content, organic matter content, and pH value. Submit data to independent testing and inspection agency for Project a specified in Sub-section 1.04E.

   5. Trees, Shrubs and Plants: Provide trees, shrubs and plants of quantity, size, genus, species, and variety shown and scheduled for landscaping and complying with recommendations and requirements of ANZI Z60.1 – American Standard for Nursery Stock. Provide healthy, vigorous stock, grown in recognized nursery in accordance with good horticultural practice and free of disease, insects, eggs, larvae and defects such as knots, sunscald, injuries, abrasions or disfigurement.

   6. Label at least one tree and one shrub of each variety with a securely attached waterproofed tag bearing legible designation of botanical and common name.
      a. Dimensions: The height and spread of all plant material shall be measured with branches in their normal positions. The caliper of other dimensions of any plant materials shall be of standard quality and size for type listed. When the same species of tree is shown in a group planting on the plan, all trees in the group shall match in height, spread and appearance. The height of balled and burlapped Palm trees shall be measure from the base of the palm above the finish grade to the bottom of the first green frond projecting upward from the palm pineapple. Refer to the Palm tree planting detail on the detail sheet.

7. Inspection: The Landscape Architect reserves the right to inspect box size trees at place of growth or upon delivery to the site prior to planting for compliance with requirements for genus, species, variety, size and quality. Owner retains the right to further inspect trees and shrubs for size and condition of root-balls, root systems, insects, injuries and latent defects, and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from project site.

E. The Applicator of all weed control materials shall be licensed by the State of California as a Pest Control Operator and a Pest Control Advisor in addition to any subcontractor licenses that are required.

1. Provide certificate of compliance from governing authority having jurisdiction indicating approval of herbicide mixture.

F. All materials and methods used for Weed Abatement must conform to Federal, State, and Local Regulations.

G. Industry Standards: The following standards shall be referenced from a part of this Section.

1. Standardized Plant Names latest edition issued by the American Joint Committee on Horticulture Nomenclature.

2. American Standard for Nursery Stock for Stock, latest edition issued by American Association of Nurserymen, Inc.

H. The Contractor shall obtain soil samples from the following areas after rough grading but prior to soil preparation and fine grading and after the initial placement of the material prior to planting: Submit Samples to Wallace Laboratories: 365 Coral Circle. El Segundo, Ca. 90245. Tel: (310) 615-0116 or an approved Soils Lab. Samples shall be taken at a minimum depth of 12 inches below the rough finish grade.

1.06 SUBMITTALS:

A. Materials lists: Within five (5) days after award of the Contract, submit a complete list of all materials proposed to be furnished and installed under this Section, demonstrating complete conformance with the requirements specified.

1. Materials list shall include the weed control materials and quantities per acre intended for use in controlling the weed types prevalent and expected on the site, as supplied by the Landscape Contractor. Landscape Contractor shall furnish the general contractor and landscape Architect data to demonstrate the compatibility of the weed control materials and methods with the intended plant and seed varieties.

2. Samples: Topsoil. Submit three 10-lb samples of topsoil fill to testing laboratory, in air-tight containers and submit to an approved Soils Laboratory for agronomic soil testing. Min 2 samples prior to amending and 1 sample at location to be determined after amending, verify location with Landscape Architect.

3. Planting Schedule: Proposed Schedule: proposed planting schedule, indicating dates for each type of landscaping work during normal seasons for such work in area of site. Correlate with specified maintenance periods to provide maintenance from date of Substantial Completion

review. Once accepted, revise dates only as approved in writing, after documentation of reasons for delays.

4. Selection, Tagging and Ordering Plant Material:
   a. Submit quantities, sizes, quality, and sources for plant materials and include photos of material for reference of quality of material expected to be delivered to site. The Landscape Architect reserves the right to review material once fully delivered to site and staged and reject any material not deemed meeting the bases of ANSI Z60.1.

   b. Submit request for inspection and documentation to the Landscape Architect and Owner at least one month prior to start of landscape planting work, certifying that all plant materials have been ordered.

   c. Plants shall be subject to inspection and rejection by the Landscape Architect and Owner at place of growth and after delivery, for conformance to specifications.

5. Certificates: Deliver all certificates to the Landscape Architect upon delivery to job site. Include:

   a. Quantity of commercial fertilizers

   b. Quantity of soil amendments.

   c. Quantity and quality of plant material

   d. Quality and purity of seed germination

6. Samples: a minimum 1-quart size sample of the following items shall be provided where applicable:
   a. Mulch
   b. Decomposed Granite
   c. Fill Sand
   d. Organic Compost
   e. Other material request by Owner/ landscape Architect at time of submittal process.

7. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to the Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod person, or other measuring device in each photograph. For species where more than twenty plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery. Photographs shall be submitted to Landscape Architect and / or District's landscape inspector after completion of rough grading.

B. Samples for Verification: For each of the following: Trees and Shrubs: Three samples of each variety and size delivered to the site for review. Maintain approved samples on-site as a standard for comparison.

1. Organic Compost and Soil Amendments: One-quart volume bag of each organic mulch type required; in sealed plastic bags labeled with composition of materials by percentage overweight and source of mulch. Each Sample shall be typical of the of material to be furnished; provide an accurate representation of color, texture, and organic makeup.

2. Mulch: Two-pound sample of each mulch required, in sealed plastic bags labeled with source of mulch. Sample shall be typical of the material to be delivered and installed at the site; provide an accurate indication of color, texture, and makeup of the material.

3. Weed Control Barrier: 12 by 12 inches.

4. Edging Materials and Accessories: Manufacturer's standard size, to verify color selected.

5. Root Barrier: Width of panel by 12 inches.

6. Decomposed Granite: One-quart volume bag of each decomposed granite type required; in sealed plastic bags and labeled. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color and texture.

7. Fill sand: One-quart volume bag.

C. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:

1. Manufacturer's certified analysis including fertilizer, soil amendments, minerals, mulch and other standard or required products.

2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

3. Submit documentation after completion of rough grading, all plant material has been secured for the project and is available in the quantities and species/varieties specified.

D. Material Test Reports: For existing native surface topsoil, existing in-place surface soil and imported or manufactured topsoil.

1.07 PRODUCT HANDLING:

A. Delivery and Storage:

1. Deliver all items to the job site in their original containers with all labels intact and legible at time of Landscape Architect's review.

2. Plants damaged during transit or delivery, or exhibiting broken limbs, defoliation or damaged from heat, frost or wind shall be rejected at the project site and replaced with new stock at no charge in Contract Time or Sum to the Owner.

3. Handle plant in a manner to avoid any damage to the plant. Protect plants at all times from sun or drying winds. Plants that cannot be planted immediately upon delivery shall be kept in the shade, well protected and adequately watered. Do not store plants on asphalt paving for a period no longer than a full workday.

4. Trees and Shrubs: Deliver trees and shrubs after preparations for planting have been completed and plant immediately. Keep Plants moist.

a. Do not prune prior to delivery unless otherwise approved by the Landscape Architect.
b. Do not bend or bind-tie trees or shrubs in such a manner as to damage bark break branches or destroy natural shape.
c. Provide protective covering during delivery.
d. If planting is delayed more than 6 hours after delivery, set trees and shrubs in shade, protect from weather and mechanical damage, and keep roots moist by covering them with mulch, burlap or other acceptable means of retaining moisture.

5. Groundcovers: Deliver plant materials immediately prior to placement. Keep plants moist. Do not remove container-grown stock from containers until planting time.

1.08 RESPONSIBILITY AND COORDINATION DURING WEED ABATEMENT:

A. During Weed Abatement procedures, the landscape contractor is responsible for the erection of all signs and barriers required to prevent intrusion into the treated areas and to notify the public.

B. No material or methods used for Weed Abatement shall affect the landscape planting or turf establishment. No material or method shall render the job site unusable for more than ten (10) days from date of application.

C. Weeds: Include Dandelion; Jimsonweed; Quack grass; Horsetail; Morning Glory; Rush Grass; Mustard, Lambsquarter; Chickweed Cress; Crabgrass, Canadian Thistle, Notgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass. Poison Ivy, Nut Sedge, Nimble Will, Bent weed, Wild Garlic, Perennial Sorrel and Brome Grass

1.09 PROJECT CONDITIONS:

A. Utilities- Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.

B. Excavation – When conditions detrimental to plant growth are encountered, such as rubble fills, adverse drainage conditions, or obstructions, notify Architect/Engineer before planting.

C. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

D. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by District or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:

1. Notify no fewer than two days in advance of proposed interruption of each service or utility.

2. Do not proceed with interruption of services or utilities without inspector or construction manager’s permission.

3. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained.

4. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements. Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated:

    a. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.10 SEQUENCING AND SCHEDULING:

A. Planting Time - Proceed with and complete landscaping work as rapidly as portions of site become available.

1. Correlate planting with specified maintenance periods to provide maintenance from date of Substantial Completion review.

2. All irrigation work shall be inspected and approved before start of any work of this section.

B. Coordination with lawns/turf areas – Plant trees and shrubs after grades are established and prior to planting lawns –hydro seeded or sodden- unless otherwise acceptable to Architect/Engineer. If planting of trees and shrubs occurs after lawn work, protect lawn areas and promptly repair damage to lawns resulting from planting operations.

C. Observations:

1. All field observations herein specified shall be made by the Landscape Architect/District. The Contractor shall request at least 48 hours in advance of the time observations are required.

2. Field Observations will be required for the following parts of the work:
    a. After rough grading is complete and the landscape contractor has crossed rip and tilled the planting areas and removed rocks in excess of one (1) inch.
    b. When fine grading is complete per Civil Engineers precise grading plans and all rocks in excess of one (1) inches are removed and completion of soil amendments.
    c. Plant material selection prior to site delivery –as time permits for review by Landscape architect. The contractor shall submit plant photographs of each material specified from the nursery of procurement. The contractor shall also submit the name of the nursery, the location and the name of the contact person along with a phone number of the nursery contact person.
    d. When plant material is spotted for installation but before planting holes are excavated and when specimen tree locations are staked.
    e. Specimen trees at source before delivery. All tree shown in tree masses or in row formation shall be matched in height and form, general appearance and shall be approved at the nursery before delivery.
    f. When finished grading is complete in groundcover and other planting areas prior to conducting an irrigation coverage test.
    g. Lawn areas prior to seeding or sodding.
    h. Thirty-day establishment period after initial Hydroseed and issuance of landscape maintenance period.
    i. Final acceptance and project turn over.

PART 2 - MATERIALS

All materials shall conform to the requirements of Section 212 of the Standard Specifications, except as modified herein.

2.01 GENERAL:

All materials shall be standard, first grade quality and shall be in prime condition when installed and accepted. Any commercially processed or packaged material shall be delivered to the site in the original unopened container bearing the manufacturer's guaranteed analysis.

A. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks or branches; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots will be rejected.

1. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

2. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

3. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

4. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.

5. f formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

2.02 SOIL CONDITIONERS AND FERTILIZERS:

Soil conditioners may include any or all of the specified conditioners herein specified and shall be applied at rates indicated in the soils report or special conditions.

2.03 TOPSOIL: Import Class 'A' Soil. Tested for agronomic and germination recommendations. Free from infestation with nematodes or other undesirable insects, plant diseased organisms and petroleum biproducts. ASTM D 5268, pH of 5.5 to 7.4 percent organic material minimum, free of stones one (1) inch or larger in any dimension.

2.04 PRE-PLANTING HERBICIDES:

A. All Chemicals used for weed control shall be registered by the State of California Department of Food and Agriculture and the Environmental Protection Agency with registration identification on the label. Label shall be at job site at all times.

B. All chemicals shall be applied as per registered label instruction and manufacturer recommendations.

C. Chemicals requiring a licensed applicator must be applied by persons registered with the County Department of Agriculture's Commissioner's Office as possessing a current, valid, qualified pest control applicator's license.

D. The use of any restricted materials is forbidden unless a special use permit is obtained from the County Department of Agriculture.

E. The non-selective, translocative herbicide shall be determined by district.

2.05 SELECTIVE HERBICIDES: Selective pre-emergent herbicides shall be in accordance with the Healthy School Act concerning use and application of pesticides and herbicides used for weed abatement and weed kill.

2.06 ORGANIC SOIL AMENDMENTS:

A. Humus material shall have an acid-soluble ash content of no less than 6% and no more than 20%. Organic matter shall be at least 50% on a dry weight basis.

B. The pH of the material shall be between 6 and 7.5.

C. The salt content shall be less than 10 milliohm/cm @ 25° C. on a saturated paste extract.

D. Boron content of the saturated extract shall be less than 1.0 part per million.

E. Silicon content (acid-insoluble ash) shall be less than 50%.

F. Calcium carbonate shall not be present if applied on alkaline soils.

G. Types of acceptable products are composts, manures, mushroom composts, straw, alfalfa, peat mosses etc. low in salts, low in heavy metals, free from weed seeds, free of pathogens and other deleterious materials.

H. Composted wood products are conditionally acceptable [stable humus must be present]. Wood based products are not acceptable which are based on red wood or cedar.

I. Sludge-based materials are not acceptable.

J. Carbon: nitrogen ratio is less than 25:1.

K. The compost shall be aerobic without malodorous presence of decomposition products.

L. The maximum particle size shall be 0.5 inch, 80% or more shall pass a No. 4 screen for soil amending.

Maximum total permissible pollutant concentrations in amendment in parts per million on a dry weight basis:

Arsenic	20	copper	150	selenium	50
Cadmium	15	lead	200	silver	10
Chromium	300	mercury	10	vanadium	500
Cobalt	50	molybdenum	20	zinc	300

M. Gypsum: To be agricultural grade gypsum and shall conform to section 212-1.2 of the standard specifications for Public Works Construction, latest edition.

N. Non-Staining Iron Sulfate: Pelletized or granular form containing not less than 18.5% expressed metallic iron and shall be registered as an agricultural mineral, with the State Department of Agriculture in compliance with Article 2 - "Fertilizer Materials", Section 1030 of the Agricultural Code as "Green Iron" manufactured by Gro-Power.

O. Ammonium Sulfate: Granular form containing not less than 21% nitrogen and 24% sulfur and shall be registered as an agricultural mineral, with the State Department of Agriculture in compliance with Article 2 - "Fertilizer Materials", Section 1030 of the Agricultural Code.

2.07 FERTILIZERS:

A. Commercial fertilizers with an analysis of 5-3-1 Gro-Power Plus, Gro-Power Controlled Release Nitrogen, 16-20-0, 12-8-8 Urea formaldehyde as designated herein, or **approved substitute as required by the Agronomic soils report.**

B. Fertilizer shall be delivered to the site in the original unopened container, bearing the manufacturer's guaranteed analysis. Any fertilizer that becomes caked or damaged, making it unsuitable for use, will not be accepted and shall be removed from site.

2.08 PLANTING TABLETS:

A. Fertilizer planting tablets shall be tightly compressed commercial grade planting tablets per Tree and Shrub planting detail. The planting tablets shall be delivered to the site in the original, unopened containers, bearing the manufacturer's guaranteed analysis.

2.09 PLANT MATERIAL: The scientific and common names of plants herein specified conform to nursery standard for plant identification; in the event of a discrepancy, the landscape architect shall decide all questions as to interpretation. (Refer to plant legend on drawings). Each group of plant materials delivered to the site shall be clearly labeled as to species and variety and nursery source. All plants shall have normally well-developed branch structure, with vigorous and fibrous root systems which are not pot bound and surface exposed. The size of the plants shall correspond with that normally expected for species and variety of available nursery stock, or as specified on the drawings. Plants larger in size than specified may be used with the approval of the landscape architect, but the use of larger plants will make no change in contract price.

A. Rejection: All plants not conforming to the requirements herein specified shall be considered defective, and such plants, whether in place or not, shall be marked as rejected and immediately removed from the site and replaced with new plant(s) at the contractor's expense. The plants shall be of the species, variety, and size as specified on the drawings or pre-selected at the nursery. Under no condition will there be any substitution of plants or sizes for those listed on the drawing.

B. Pruning: At no time shall a tree or shrub be pruned, trimmed or topped prior to delivery, and any alteration of their shape shall be conducted only with the approval and when in the presence of the landscape architect.

C. Protection: All plants shall be handled and stored so that they are adequately protected from drying out, from windburn, or from any other injury.

D. Right of Inspection: The landscape architect reserves the right to approve or reject at any time upon delivery or during installation any or all plant material not conforming to plan specification, size, variety or condition.

2.10 ORGANIC MULCH MATERIAL: provided by AGRONIM ES -2 Cover mulch or equal.

2.11 DECOMPOSED GRANITE:

A. Decomposed Granite: Igneous rock which has weathered in place or any sedimentary material principally derived from igneous rock. Provide washed material free of organic material and other deleterious substances. All decomposed granite to be pre-stabilized with 'stabilizer' by Stabilizer, Inc.

B. Material shall be C-35 conforming to the following gradation as determined by ASTM C 136:

1. Sieve Size	Percent Passing (by weight)
A. 3/8 inch	B. 100
No. 4	100
No. 8	93
No. 16	65
No. 30	44
No. 50	28
No. 100	16
No. 200	8.7

2. Resistance "R" value 82%.
3. Sand equivalent value 61%.

2.12 WEED-CONTROL BARRIERS:

A. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 3 oz. /sq. yd. minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally encountered chemicals, alkalis, and acids. Mirafi 140N.

B. Composite Fabric: Woven, needle-punched polypropylene substrate bonded to a nonwoven polypropylene fabric, 4.8 oz. /sq. yd. Mirafi 700X.

2.13 TREE STABILIZATION MATERIALS:

A. Stakes and Ties:

1. Upright and Guy Stakes: Rough-sawn, sound, new lodge pole pine, free of knots, holes, cross grain, and other defects. Size of tree grates shall be as indicated on planting detail.

2. Flexible Ties: Shall be manufactured of virgin flexible vinyl meeting ASTM-D-412 standards for tensile and elongation strength. Material shall be black for ultraviolet resistance.

3. Tree ties shall be manufactured with a double back locking configuration and secured with one galvanized nail to prevent slippage. Tree ties shall elongate with

the tree growth preventing damage to the tree. Install and secure per manufacturer's written recommendations:

a. Products: Subject to compliance with requirements, available products that may be incorporated into the work include, but are not limited to the following:

1) VIT Products, Inc. 32" for 24" box and smaller cinch belts/buckles for 36" box.

5. Rigid Braces: ½" round threaded metal rod shall be encased in U.V. black vinyl tubing placed at the center of the rod. The rod is to be bent in a 360-degree circle

6. The meeting points of the rod shall be spread apart permitting the brace to be placed on the tree by holding it parallel to the tree trunk with one open part of the circle on either side of the trunk. The threaded ends shall be inserted through drilled holes in the stakes or poles secured with nuts, lock washers and flat washers. Rigid braces to be used with Landscape Architect/ District approval only:

a. Products: Subject to compliance with requirements, available products may be incorporated into the work include, but are not limited to the following:

1) VIT Products, Inc. TB 24, TB 36 and TB 42.

2.14 LANDSCAPE EDGINGS:

A. Concrete mow strip / header: Concrete mow strip shall be 6" x 6" in dimension and contain (1) on #3 rebar continuous. Rebar shall overlap 12" at all splices. Expansion joints shall be located at 48" O.C. Refer to section 321313 CONCRETE, for concrete material specifications.

B. Epic Plastics Benda Borad Landscape Edging. Color: Sand, 1" x 6". Refer to detail and install per manufacturer's "installation guidelines.".

2.15 ROOT BARRIERS:

A. Black, molded, modular panels manufactured with 50% recycled polyethylene plastic with ultraviolet inhibitors, 85 mils thick, with vertical root deflecting ribs protruding ¾ in out from panel, and each panel 24" wide:

Products: Subject to compliance with requirements, available products that may be incorporated into the work include, but are not limited to the following:

a. Deep Root Corporation –Linear Guide #UB-24.

Products shall be installed as follows, unless otherwise indicated on drawings:

a. 15-gallon trees: #UB-24.
b. 24-inch box trees: #UB-24.
c. 36-inch box trees: #UB-24.
d. 48 in box trees and larger: Per manufacturer's recommendations.

Provide deep root corporation, 'water barrier' for all bamboo installations.

2.16 HYDROSEED:

A. Type of Hydro seed shall be as noted on the drawings. Refer to Planting Legend.

2.17 SOD:

A. Type of Sod shall be noted on the drawings. Refer to Planting Legend.

2.18 COBBLESTONE /BOULDERS:

A. Cobblestone shall be 3"– 8 "cobble, Arizona available at Southwest Boulders. Set cobblestone in 3 sack slurry mix.

B. Boulders shall be Sierra Select available at Southwest Boulders. Bury boulders one third depth, place in slurry mix.

PART 3 - EXECUTION

Installation shall conform to the requirements of Section 308 of the "Standard Specifications," except as modified herein.

3.01 GENERAL*:* Prior to the start of work of this Section, all trash and deleterious materials on the surface of the ground shall be removed and legally disposed of. Verify the following information prior to commencement wit work:

A. Verify that topsoil material to be reused is acceptable and has been tested pursuant to all state and local requirements for lead, mercury, or any other contaminants.

B. Verify that building and trench backfilling has been completed and inspected.

C. Verify that the subsoil base has been scarified, contoured, and compacted.

D. Verify that all existing utilities have been protected and are in good working condition prior to commencement of seeding. Make necessary repairs as required.

E. Verify that drainage and grading has been completed per Civil Engineers precise grading plans.

3.02 EXAMINATION:

A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance:

B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.

C. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.

D. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.

E. Uniformly moisten excessively dry soil that is not workable, and which is too dusty.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

G. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

H. Notify architect minimum 5 working days prior to the following reviews to be attended at their option:

1. Pre-installation conference.
2. Completion of fine grading.
3. Delivery of plant materials, tree layout and sample plan.
4. After installation of 1 tree for conformance to specified details.

3.03 WEED ABATEMENT:

A. Prior to the installation of the irrigation system, all weed growth shall be removed within the areas designated to be cleared and grubbed. Refer to plans for limit of work.

1. Perennial grasses and weeds existing in the planting areas require control prior to removal, spray these areas in accordance with the Healthy School Act and per the districts Pest Control Adviser's recommendations. Physically remove all weeds and undesirable material from the site.
2. Remove all dead weeds by rake or hoe to a depth of one to two inches (1" to 2") below the surface of the soil. Remove all weed and/or undesirable grass residue and top growth and dispose of in a legal manner.

3. Upon completion of all fine grading work and prior to soil preparation, perform weed control measures.

4. Apply a pre-emergent (Roundstar G or approved equivalent) at a minimum rate of 150 lbs per acre.

5. Irrigate all areas designated to be planted on which pre-emergent is applied for a minimum of 10 minutes per setting, two settings per application.

6. Refer to the Planting Plan for recommended Weed Abatement Schedule.

3.04 SOIL PREPARATION AND FINE GRADING:

A. Soil Preparation: Prior to amending the surface, soil should be cross-ripped or otherwise tilled to a depth of twelve inches (12"). All planting areas receive soil preparation. All rock one inch (1") and larger shall be removed to a depth of four inches (4"). Dispose of all debris off-site in a legal manner.

B. Planting Areas: To all planting areas, uniformly broadcast soil amendments and thoroughly incorporate to a minimum six-inch (6") depth by means of a rototiller or equal.

Soil Amendments are to be thoroughly incorporated at the following rates per one thousand square feet (1,000 sf.) by rototilling or other approved method:

3 cu. yds.	Organic amendment
200 lbs.	5-3-1 Commercial fertilizers
10 lbs.	Iron Sulfate
50 lbs.	Agricultural Gypsum

C. Deep water leaching:

1. After initial soil sample(s) have been taken, soil has been amended and installation / testing of the irrigation system is complete, all areas shall be deep water leached and compacted and settled by continuous application of irrigation water until the soil has received a minimum of 8" of water.

2. After leaching operation, soil samples shall be taken again by Contractor per Architect's direction and given to the district's soil laboratory for a final testing. Soil test shall meet the following requirements:
   a. ECe - Maximum 3.0.
   b. pH - Maximum 7.50.
   c. Minimum 6.00 PH.

3. Re-application of soil amendment and leaching operation shall be waived by the district if the district determines the EC and pH are at acceptable levels.

4. Deep water leaching shall be done prior to the application of commercial fertilizer; however, gypsum and compost must be adequately roto-tilled into the upper 12" prior to the leaching process.

5. Do not undertake leaching operations in expansive soils.

6. Care shall be taken that the rate of application of water does not cause erosion or sluffing of soils.

D Finish Grade:

1. Rough grade shall be within one tenth (1/10) of one foot (1') of finish grade.

2. Work such as fine grading and light cultivation are required of all planting areas indicated on plan to prepare grades prior to seed or stolon planting.

3. After approximate finished grades have been established, all soil areas shall be compacted and settled by application of heavy irrigation to a minimum depth of twelve inches (12").

3.04 PLACEMENT OF TOPSOIL: Refer to Earth Moving Section

A. Place topsoil in raised planter areas as shown on the plans.

B. Fine grade area(s) to desired elevations and contours as referenced on the plans.

C. Compact area to desired compaction.

3.05 FINAL GRADES:

A. After the foregoing specified deep watering, minor modifications to grade may be required to establish the final grade. These areas shall not be worked until the moisture content has been reduced to a point where working it will not destroy soil structure.

B. Refer to the Civil Engineer's Precise Grading Plans for drainage and grading of all planting areas.

C. Finished earth berm surfaces shall be smooth and even between contours; shapes shall be to the satisfaction of the Landscape Architect.

D. All areas shall be graded so the final grades will be two inches (2") below adjacent curbing in shrub/groundcover areas, one inch (1") below adjacent sidewalks in turf areas. Set final grades flush in playfields adjacent to valve boxes.

E. Eliminate all erosion scars.

3.06 TREE AND SHRUB INSTALLATION:

A. Actual planting shall be performed during those periods when weather and soil conditions are suitable and in accordance with locally acceptable horticultural practices.

B. All irrigation work shall have been reviewed by the Landscape Architect prior to beginning any planting.

C. Installation of all plant material shall be in accordance with the planting details.

D. Locations for plants and outlines of areas to be planted shall be marked on the ground by the Landscape Contractor before any plant pits are dug. The landscape architect shall review all locations. If any underground utilities are encountered in the excavation of the planting areas, notify the Landscape Architect immediately so that other locations for planting may be selected.

E. Excavation for Planting:

1. Excavation for planting shall include the stripping and stacking of all acceptable topsoil encountered within the areas to be excavated for trenches, tree holes, plant pits and planting beds.

2. Protect all areas from excessive compaction when trucking plants or other material to the site.

3. All excavated holes shall have vertical sides with rough surfaces and shall be of a size is at least twice the width and depth of the original plant container. The holes shall be, in all cases, large enough to permit planting without damage to the rootball. Compact soil so depth of rootball is three (3") higher than existing grade.

F. Planting:

1. No planting shall be done in any area that is under construction, where the grades have not been established or fine graded until the area concerned has been satisfactorily prepared in accordance with these specifications.

2. No more plants shall be distributed in the planting area on any day than can be planted and watered on that day.

3. Containers shall be cut, and plants shall be removed in such a manner that the ball of earth surrounding the roots is not broken, and they shall be planted and watered as herein specified immediately after the removal from the containers. Containers shall not be cut or broken prior to placing the plant in the planting areas.

4. The amended surface shall be used for backfill around trees and shrubs; use the following formula (thoroughly blended):

Native on-site soil (Refer to soils report. Import soil may be used)	6 parts
Organic Amendments	4 parts
Commercial Fertilizer 5-3-1	15 lbs/cy
Iron Sulfate	2 lbs/cy.

Note: Mix proportions are for bid purposes only. If mix proportions differ from agronomic soils test results notify the architect and or general contractor immediately.

5. Three inches of amend backfill shall be thoroughly mixed with three inches of native or import soil at the bottom of each hole to provide a transitional soil mix of at least six inches between the native soil and backfill.

6. Backfill shall be placed at the bottom of each hole and thoroughly compacted to a height that when a plant is placed in the hole, its root crown is three inches (3") above the established final grade. Any plants which settle deeper than specified above, shall be raised back to the correct level. After the plant has been placed, additional backfill shall be added to the hole to cover approximately one-half the root ball. At this stage, water shall be added to the top of the partly filled hole to thoroughly saturate the root ball and adjacent soil.

7. After the water has completely drained, fertilizer tablets shall be place as indicated:

3 tablets per one-gallon container
6 tablets per five-gallon container

3.07 TURF AREA PREPARATION:

A. Prior to planting turf, prepare surface soil as follows:

1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.

2. Remove 8 inches of existing surface soil.

3. Add 8 inches of new Class A topsoil with a minimum amount of organic matter 50% dry weight. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 8 inches of soil. Till soil to a homogeneous mixture of fine texture.

4. Remove stones larger than 1/2 inch in any dimension and sticks, roots, trash, and other extraneous matter to a depth of 6”.

5. Legally dispose of waste material, including grass, vegetation, and turf, off District's property.

6. Compost material per CHPS credit ME2.1 if directed.

B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

C. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

D. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

1.08 SEEDING:

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other:

1. Do not use wet seed that is moldy or otherwise damaged.

2. Do not seed against existing trees. Limit seed a minimum of 24” from trunks.

B. Sow seed at a total rate recommended by supplier.

C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

D. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch] or planting soil within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch, and roll surface smooth.

3.09 HYDROSEEDING:

A. Hydro seeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydro seed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application:

1. Mix slurry with fiber-mulch and manufacturer's recommended tackifier.

2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited per supplier’s recommendations, and seed component is deposited at not less than the specified seed-sowing rate.

3. Minimum Purity: 97% (Exclusive of coating material), Minimum Germination: 90%

4. Minimum Germination: 90%

5. Application Specification:

a. Mulch: 2,000 lbs. per acre. Wood fiber or clean paper free of impurities

b. Binder: M-Binder at 40 to 160 lbs. per acre depending on degree of slope. Add slowly to tank to avoid clumping.

c. Pre-Plant Fertilizer: Starter fertilizer (15-15-15) at 400 lbs. per acre. Incorporate additional elements as needed by soil test.

d. Seeding Rate: 10-12 lbs. per 1,000 square feet.

3.10 SODDING:

A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass:

1. Lay sod across angle of slopes exceeding 1:3.
2. Anchor sod on slopes exceeding 1:6 with wood pegs spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

3.12 TREE, SHRUB, AND VINE PRUNING:

A. Remove only dead, dying, or broken branches as directed by Architect. Do not prune for shape.

B. Prune, thin, and shape trees, shrubs, and vines as directed by Architect. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices.

C. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

D. Do not apply pruning paint to wounds.

3.13 PLANTING AREA MULCHING:

A. Install weed-control barriers (if specified) before mulching according to manufacturer's written instructions. Completely cover area to be mulched, overlapping edges a minimum of 12 inches and secure seams with galvanized pins.

B. Mulch backfilled surfaces of all planting areas and other areas indicated on the plans, unless no mulch is indicated:

1. Organic Mulch in Planting Areas: Apply 3-inch average thickness of organic mulch extending 12 inches beyond edge of individual planting pit or trench and over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 2-inchs of trunks or stems.

2. Organic mulch shall not be applied to landscape areas that exceed 3:1 in slope gradient.

3.14 EDGING INSTALLATION:

A. Concrete mow strip / header: Install concrete mow curbs per standard detail and per Section 321313 – Concrete Paving.

B. Shovel-Cut Edging: Separate mulched areas from turf areas with a 45-degree, 4- to 6-inch-deep, shovel-cut edge.

3.15 ROOT-BARRIER INSTALLATION:

A. Install root barrier where trees are planted within 84 inches of paving or other hardscape elements, such as walls, curbs, and walkways unless otherwise shown on Drawings.

B. Align root barrier vertically with bottom edge angled at 20 degrees away from the paving or other hardscape element and run it linearly along and adjacent to the paving or other hardscape elements to be protected from invasive roots.

C. Install root barrier continuously in each direction from the tree trunk. If trees are spaced closer, use a single continuous piece of root barrier:

1. Position top of root barrier per manufacturer's recommendations.
2. Do not distort or bend root barrier during construction activities.
3. Do not install root barrier surrounding the root ball of tree.

3.16 WATERING:

A. Apply water to all planted areas during operations and thereafter, until acceptance of the work. Apply water in sufficient quantities and as often as seasonal conditions require keeping the planted areas sufficiently moist at all times, well below the root system of grass and plants.

B. All turf areas shall be kept damp at all times and irrigation should be adjusted accordingly. This normally would involve four (4) to six (6) watering periods daily, each watering period (ON) regulated to just dampen the mulch without creating run off.

1. Intervals between irrigation (OFF) sequences should be judged by the length of the time mulch remain damp. Once the mulch begins to dry out, the water (ON) sequence should be repeated.

3.17 ESTABLISHMENT AND MAINTENANCE PERIOD: The Contractor shall continuously maintain all areas involved in this contract during the progress of the work and during the 30-day establishment period for all turf and Ground cover areas and (90) day maintenance until final acceptance of the work by the Owner. Plant establishment period: The contractual establishment period shall be for no less than thirty - (30) continuous calendar days. The contractual establishment period begins on the first day after all planting in this project is completed and accepted and the planted areas are brought to a neat, clean and weed free condition. (All turf areas and Ground cover areas installed by flats shall be reviewed under the establishment period).

A. Landscape maintenance period: ***Upon the acceptance of the substantial completion of the landscape and irrigation installation the landscape maintenance period may***

begin. The Contractor shall request an on-site review of the landscape at the end of the establishment period. The turf areas shall show an even, healthy stand of grass free of patches or spare spots. The contractor will be notified in writing the acceptance of the establishment period and commencement of the maintenance period. If such criteria are met to the satisfaction of the district, a field notification shall be issued to the Contractor from the district, to establish the effective beginning date of the Maintenance Phase. The district has the ultimate authority in setting the beginning date for the maintenance period.

1. Any day when the Contractor fails to adequately maintain plants replace unsuitable plants or do weed control or other work, as determined necessary by the Landscape Architect and/or owner's field representative will not be credited as one of the landscape maintenances working days.

2. In order to carry out the landscape maintenance work, the Contractor shall furnish protective barriers/fences around landscape areas, sufficient men and adequate equipment to perform the work during the maintenance period. The Contractor shall be responsible for maintaining adequate protection of the entire project area. Damaged areas caused by erosion, tire damage, graffiti, pests or other damage as deemed by the district shall be repaired at the Contractor's expense.

B. All sidewalks, paved areas and other areas adjacent to the planting areas shall be cleaned of all debris, soil, or other materials at intervals of not more than seven (7) days.

1. Improper maintenance or possible poor condition of any planting during the scheduled landscape maintenance period may cause postponement of the final acceptance of the landscape maintenance period. Contractor shall bear all costs for extension of the Landscape maintenance period.

2. In the event there is evidence of poor-100% germination of the turf grass seed or poor performance of the sod or shrub/groundcover areas, the contractor shall obtain an agronomic soils test for each area and provide copies of the test results to the district to verify the appropriate use and incorporation of amendments per agronomic soils reports and appropriateness of all maintenance work performed. If additional fertilizers are needed, up to a maximum of 25% beyond the amount specified, such amendments shall be provided by the Contractor at no additional cost to the district.

3. Depressions caused by vehicles, bicycles, or foot traffic shall be filled and leveled. Replant damaged areas with same material unless area was prior seed with turf grass or a Hydroseed mix –plant area with sod or select shrub species identified in seed mix at one (1) gallon minimum or as readily available. Replant at no expense to district unless damage was caused by other trade contractors.

C. Plant Maintenance:

1. All areas shall be kept free of debris, and all planted areas shall be weeded at intervals of not more than ten (10) days. Watering, mowing, fertilization, spraying and pest control, as may be required, shall be included in the maintenance period. Maintenance shall include gopher control.
    a. All personnel on the project shall be well trained, clean, and neat at all times and be conversant with these specifications.
    b. All work shall be performed in accordance with the best landscape maintenance practices and in keeping with the high aesthetic level of facilities being maintained.

c. Contractor shall be responsible for removing all weeds in joints of sidewalks, curbs, and hardscape throughout the project.
d. All landscape areas shall be patrolled weekly to check for vandalism damage, broken tree branches, rodents, insects, pest and diseases.
e. Water Management:
f. Water only as required to allow penetration into the soil and avoid excess run-off. Once plant material is established, water only as needed to maintain healthy plant material.
g. Avoid water waste by setting controllers appropriately for current season and weather.

h. Avoid blocking the clear view of signs, illumination of light poles fixtures, the airflow out of vents and conflict with pedestrian and vehicles and their views.
i. Safety of users shall be a prime goal of maintenance especially in regard to pruning of trees and trimming of ground covers away from walkways and/or structures.
j. The Contractor, at his own expense, shall replace all dead or damaged plant material during the maintenance period and prior to final acceptance of the maintenance period.

2. Pruning Trees – prune trees to select and develop permanent scaffold branches that are smaller in diameter than the trunk branch to which they are attached that have vertical spacing from 18" to 48" and radial orientation. Other pruning shall be performed to correct the following:
    a. So permanent scaffold branches do not overlay one another.
    b. To eliminate diseased or damaged growth.
    c. To eliminate narrow V-shaped branch forks that lack strength.
    d. To reduce toppling and wind damage by thinning out crowns.
    e. To maintain growth within space limitation
    f. To maintain natural appearance.
    g. To balance crown with roots.
    h. All tree pruning shall be done with hand equipment operated from the ground. If trees are larger than able to be pruned in such a manner, the condition will be brought to the attention of the district.
    i. Remove no more than 50% of a plant's foliage during pruning operations.
    j. Topping of trees will not be tolerated unless approved by the district.

3. Under no circumstances shall stripping of lower branches, (raising up or skirting) of young trees be permitted. Lower branches shall be retained in a pinched back condition with as much foliage as possible to promote caliper trunk growth (tapered trunk). Lower branches can be cut flush with the trunk only after the tree is able to stand erect without staking or other support. No stubbing of major branches will be accepted.

4. Evergreen trees shall be thinned out and shaped, when necessary, in prevent wind and storm damage. The primary pruning of deciduous trees shall be done during the dormant season. Damaged trees or those that constitute health or safety problems shall be pruned at any time of the year as required.

5. Post fertilizes all turf areas at the end of every 45-60 days (of maintenance) at the rate of three pounds (3 lbs.) per one thousand square feet (1,000 sf.) using ammonium sulfate, 21-7-14, evenly applied and thoroughly watered in. The first application should occur 14 days after planting. Thirty (30) days after planting fertilize with 20-6-10 fertilizer at rate of three to four (3 to 4) lbs per 1,000 square feet. Water thoroughly. In early fall and spring, substitute a complete fertilizer such as 16-6-8 or equal for the ammonium sulfate at a rate of 6 lbs. per 1000 sf.

6. Mowing of turf will commence when turf grass has reached a height of one inch (1"). The height of cut will be ½" to 3/4" as directed by the Grounds Supervisor. Mowing will be at least weekly after the first cut. Turf must be well established and free of bare spots and weeds to the satisfaction of the Landscape Architect prior to final acceptance by the Owner.
   a. Excess grass clippings shall be picked up and removed from site. Do not leave grass clipping on newly cut turf grass, remove immediately.

7. The Contractor shall maintain the irrigation systems in a like new operating condition, adjusting head heights and spray arcs as necessary. The Contractor is responsible for proper watering of all planting areas, for providing any necessary supplemental water as may be required and shall replace any material damaged due to improper moisture.

8. During the maintenance period, the Contractor shall be responsible for maintaining adequate protection for all planting areas. Removing all litter and foreign debris from planters and planting areas. Any damaged areas shall be repaired, and any plant materials replaced at the Contractor's expense. Replace all shrubs, trees and groundcover deemed to be in poor health or dead during the maintenance period.

9. Weed Control: Keep basins and areas between plants free of weeds. Use recommended legally approved pre-emergent herbicides and removal by hand methods. Avoid frequent soil cultivation that destroys shallow roots. Use mulches to help prevent weed seed germination. Avoid post-emergent herbicides in groundcover areas where overspray may kill young, rooted cuttings.
   a. Use of chemical spraying maybe necessary to rid turf areas of noxious weeds.

10. Insect Control: Maintain reasonable control with approved materials and methods that are legally accepted in the area.

11. The Contractor's maintenance period will be extended past the (90) days if these provisions are not filled.

3.18 GUARANTEE AND REPLACEMENT:

A. Any turf/groundcover area found to be dead or in poor condition due to such improper weed abatement practices and/or methods, as determined by the Landscape Architect and/or Owner, shall be replaced by the Contractor at his expense.

B. Material and Labor involved in the replacing of material shall be supplied by the Landscape Contractor at no additional cost to the Owner.

C. All plant material installed under the contract shall be guaranteed against any and all poor health, inadequate or inferior materials and or improper installation for a period of one (1) year. This guarantee shall commence on the date of final acceptance of the project after the completion of the contract's maintenance period. Any plant found to be dead or in poor condition resulting from improper planting; fertilization as determined by the District/Landscape Architect shall be replaced by the contractor at no expense to the district.

D. Any plant material –trees, shrubs, groundcover and/or turf –found to be dead, missing or in poor condition as determined by the Landscape Architect during the contract maintenance period shall be replaced immediately and not at the end of the contract maintenance period. The Landscape Architect shall be the sole judge as to the condition of plant material. Material

replaced within the guarantee period shall be replaced by the contractor within seven (7) days.

E. All plant material shall have new growth trimmed neatly, turf shall be mowed, and all hardscape shall be cleaned prior to final acceptance.

END OF SECTION

SECTION 33 11 00
WATER UTILITY DISTRIBUTION PIPING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Pressure Piping and Joints, Fittings, and Connections
   2. Pipeline Identification
   3. Valves
   4. Hydrants
   5. Backflow Prevention Devices
   6. Accessories
   7. Thrust Blocking

B. Products Supplied But Not Installed Under This Section

C. Products Installed But Not Supplied Under This Section

D. Related Sections
   1. 31 23 26 Base Course
   2. 32 13 13 Concrete Paving

E. Allowances

F. Unit Prices

G. Measurement Procedures

H. Payment Procedures

I. Alternates

1.02 REFERENCES

A. The "Greenbook" Standard Specifications For Public Works Construction, Current Edition (S.S.P.W.C.)

B. ASSE Standard #1013 - Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Principle Fire Protection Backflow Preventers

C. ASSE Standard #1015 – Performance Requirements for Double Check Backflow Prevention Assemblies and Double Check Fire Protection Backflow Prevention Assemblies

D. AWWA C104 - Cement-Mortar Lining for Ductile- Iron Pipe and Fittings.

E. AWWA C105 – Polyethylene Encasement for Ductile-Iron Pipe Systems.

F. AWWA C110 –Ductile-Iron and Gray-Iron Fittings

G. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

H. AWWA C151 - Ductile-Iron Pipe Centrifugally Cast

I. AWWA C300 - Reinforced Concrete Pressure Pipe, Steel Cylinder Type

J. AWWA C502 - Dry-Barrel Fire Hydrants.

K. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.

L. AWWA C651 - Disinfecting Water Mains.

M. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. for Water Transmission and Distribution.

N. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, ½ In. through 3 In. for Water Service.

O. AWWA M9 – Concrete Pressure Pipe.

P. AWWA M11 – Steel Pipe: A Guide for Design and Installation.

Q. AWWA M14 – Backflow Prevention and Cross-Connection Control.
R. AWWA M17 - Installation, Field Testing, and Maintenance of Fire Hydrants.
S. AWWA M23 - PVC Pipe: Design and Installation.
T. AWWA M41 – Ductile-Iron Pipe and Fittings
U. AWWA M44 – Distribution Valves: Selection, Installation, Field Testing, and Maintenance.
V. AWWA M45 – Fiberglass Pipe Design
W. AWWA M55 – P.E. Pipe – Design and Installation
X. ASTM B88 – Standard Specification for Seamless Copper Water Tube.
Y. ACPA – American Concrete Pipe Association, Concrete Pipe Design Manual.
Z. ACPA – American Concrete Pipe Association, Concrete Pipe Installation Manual.
AA. CDA – Copper Development Association, Copper Tube Handbook.
BB. NFPA 1963 – Standard for Fire Hose Connections.
CC. UL246 – Standard for Hydrants for Fire Protection Services.

1.03 DEFINITIONS
A. ASSE: American Society of Sanitary Engineers
B. AWWA: American Water Works Association

1.04 SYSTEM DESCRIPTIONS
A. Design Requirements, Performance Requirements
1. All specified construction materials and construction methods shall comply with the "Greenbook", Standard Specifications for Public Works Construction, current edition.

1.05 SUBMITTALS
A. General
B. Product Data
1. Submit manufacturer's product data for products specified.
a. Include technical data for pipe, accessories, gaskets, joints, and couplings.
C. Shop Drawings
D. Samples
E. Quality Assurance/Control Submittals
1. Design Data, Test Reports, Certificates, Manufacturers' Instructions, Manufacturers' Field Reports, Qualification Statements
a. Disinfection Submittals
1. Submit in accordance with S.S.P.W.C., Section 306-8.9.4.2 including the following:
a. Testing, Disinfection, Flushing and Dechlorinating Plan.
b. Written permission to discharge into sewer or storm drain.
c. Laboratory report for disinfection testing.
b. Hydrostatic Pressure Test
1. Submit test results in accordance with AWWA C600 or C605.
F. Closeout Submittals
1. As-Built Drawings

a. Submit as-built drawings indicating location of pipe runs, connections, and depths.
b. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06 QUALITY ASSURANCE
- A. Qualifications
  1. Provide valves from the same manufacturer.
  2. Provide hydrants from the same manufacturer.
  3. Provide Backflow Prevention Devices from the same manufacture.
  4. All materials/products shall be new.
- B. Regulatory Requirements
  1. No pipe, pipe fitting, or any other fitting or fixture intended to convey or dispose water for human consumption for drinking or cooking is allowed in the domestic plumbing system, if they do not meet the low lead definition of Health and Safety Code 116875. Weighted average lead content of the wetted surface area of pipes, fittings and fixtures may not exceed 0.25 percent.
- C. Certifications
- D. Field Samples
- E. Mock-ups
- F. Pre-installation Meetings

1.07 DELIVERY, STORAGE, AND HANDLING
- A. Packing, Shipping, Handling, and Unloading
  1. In accordance with S.S.P.W.C., Section 306.
- B. Acceptance at Site
  1. In accordance with S.S.P.W.C., Section 306.
- C. Storage and Protection
  1. In accordance with S.S.P.W.C., Section 306.
- D. Waste Management and Disposal

1.08 PROJECT CONDITIONS
1.09 SEQUENCING
1.10 SCHEDULING
1.11 WARRANTY
1.12 SYSTEM STARTUP
1.13 OWNER'S INSTRUCTIONS
1.14 COMMISSIONING
1.15 MAINTENANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS
2.02 EXISTING PRODUCTS
2.03 MATERIALS
- A. General
  1. Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, and capacities as indicated on drawings.

2. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in potable water systems.
3. Where more than one type of materials or product is indicated, selection is Installer's option.

B. Pressure Piping and Joints, Fittings, and Connections
1. Ductile Iron Pipe (DIP)
a. S.S.P.W.C. Table 209-1.1.2.
2. Fabricated Steel Pipe and Fittings
a. S.S.P.W.C. Table 209-2.2.1.
3. Mill-Type Steel Pipe
a. S.S.P.W.C. Table 209-2.3.1.
4. Stainless Steel Water Pipe
a. S.S.P.W.C. Table 209-2.4.1.
5. Concrete Pressure Pipe
a. S.S.P.W.C. Table 209-3.2.
6. PVC Pressure Pipe
a. S.S.P.W.C. Table 209-4.2.
7. High-Density Polyethylene (HDPE) Solid Wall Pressure Pipe
a. S.S.P.W.C. Table 209-5.2.
8. Fiberglass Pressure Pipe
a. S.S.P.W.C. Table 209-6.2.

C. Pipeline Identification
1. S.S.P.W.C., Table 209-7.2.

D. Flanged and Threaded Connections
1. S.S.P.W.C., Section 212-2.

E. Valve Actuators, Extensions, and Valve Boxes
1. S.S.P.W.C., Section 212-4.

F. Valves
1. S.S.P.W.C., Section 212-5.

G. Hydrants
1. S.S.P.W.C., Section 212-6.
2. Shall be LFAHJ approved.
3. Color Scheme and Finish: LFAHJ standard.

H. Backflow Prevention Devices
1. S.S.P.W.C., Section 212-7.
2. Shall be LFAHJ approved.
3. Color Scheme and Finish: LFAHJ standard.

I. Expansion Joints
1. S.S.P.W.C., Section 212-9.

J. Service Laterals, Meters, and Meter Boxes
1. S.S.P.W.C., Section 212-10.

K. Pressure Gauges
1. S.S.P.W.C., Section 212-11.

L. Thrust Blocking
1. S.S.P.W.C., Section 306-8.8.3.

2.04 MANUFACTURED UNITS
2.05 EQUIPMENT
2.06 COMPONENTS
2.07 ACCESSORIES

2.08 MIXES
2.09 FABRICATION
2.10 FINISHES
2.11 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.01 INSTALLERS
3.02 EXAMINATION
- A. Site Verification of Conditions
  1. Verify that trenches are cut and ready to receive work, and excavations, dimensions, and elevations are as indicated.
  2. Beginning of installation means acceptance of existing conditions.

3.03 PREPARATION
- A. Protection
- B. Surface Preparation
  1. Trench Excavation
     a. In accordance with S.S.P.W.C., Section 306-3.
  2. Correct over excavation with fill material or sand.
  3. Remove large stones or other hard matter which could damage drainage tile or impede consistent backfilling or compaction.

3.04 ERECTION
3.05 INSTALLATION
- A. Pressure Pipes and Fittings
  1. General
     a. Install in accordance with S.S.P.W.C., Section 306-8.
     b. Maintain separation of products conveying potable water and products conveying fluids other than potable water.
     c. Route pipe in as straight lines as possible.
     d. Install pipe to allow for expansion and contraction without stressing pipe joints.
  2. Ductile Iron Pipe (DIP)
     a. Install in accordance with S.S.P.W.C., Section 306-8.2.
  3. Steel Pipe
     a. Install in accordance with S.S.P.W.C., Section 306-8.3.
  4. Concrete Pressure Pipe
     a. Install in accordance with S.S.P.W.C., Section 306-8.4.
  5. PVC Pressure Pipe
     a. Install in accordance with S.S.P.W.C., Section 306-8.5.
  6. High-Density Polyethylene (HDPE) Solid Wall Pressure Pipe
     a. Install in accordance with S.S.P.W.C., Section 306-8.6.
  7. Fiberglass Pressure Pipe
     a. Install in accordance with S.S.P.W.C., Section 306-8.7.
- B. Pipeline Identification
  1. Install in accordance with S.S.P.W.C., Table 209-7.2.
- C. Valves
  1. Install in accordance with S.S.P.W.C., Section 306-8.8.
  2. Provide valve boxes over underground valves.
- D. Hydrants

1. Install in accordance with S.S.P.W.C., Section 306-8.8.
2. Install in accordance with LAHJ requirements.
3. Paint Finish: LFAHJ standard.

E. Backflow Prevention Devices
1. Install in accordance with S.S.P.W.C., Section 306-8.8.
2. Install in accordance with AWWA M14.
3. Install in accordance with LAHJ requirements.
4. Paint Finish: LFAHJ standard.

F. Thrust Blocking
1. Install in accordance with S.S.P.W.C., Section 306-8.8.3.

3.06 APPLICATION
3.07 CONSTRUCTION
3.08 REPAIR/RESTORATION
3.09 RE-INSTALLATION
3.10 FIELD QUALITY CONTROL

A. Site Tests, Inspection
1. Project Inspector of Record shall be present for all testing and inspections.
2. Pipeline Pressure Testing, Disinfection, and Commissioning
a. General
1. In accordance with S.S.P.W.C., Section 306-8.9. et. seq.
b. Hydrostatic Pressure Test
1. Test in accordance with S.S.P.W.C., Section 306-8.9.2.
c. Testing of Valves and Appurtenances
1. Test in accordance with S.S.P.W.C., Section 306-8.9.3.
d. Disinfection
1. In accordance with S.S.P.W.C., Section 306-8.9.4.

B. Manufacturers' Field Services

3.11 ADJUSTING
3.12 CLEANING
3.13 DEMONSTRATION
3.14 PROTECTION
3.15 SCHEDULES

END OF SECTION