

**SYCAMORE CANYON SCHOOL
MODULAR ADDITION
SANTEE SCHOOL DISTRICT**



SPECIFICATIONS

March 12, 2020

**Project Tracking No. 68361-114
DSA File No. 37-66, DSA Application No. 04- 119104**



**515 Encinitas Blvd., Ste. 201, Encinitas, CA 92024
Ph. 760.753.6800 Fax 760.552.7541**

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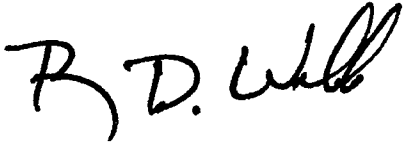
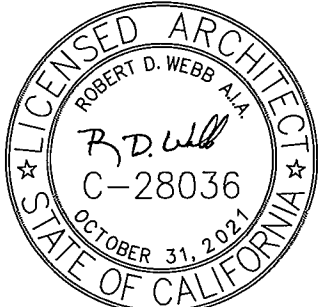

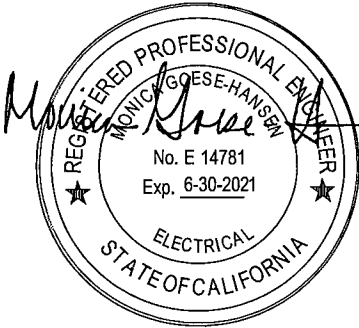
PROCUREMENT AND CONTRACTING REQUIREMENTS

SANTEE SCHOOL DISTRICT

**SYCAMORE CANYON SCHOOL
MODULAR ADDITION
SANTEE SCHOOL DISTRICT**

STATE OF CALIFORNIA Department of General Services DIVISION OF THE STATE ARCHITECT San Diego Regional Office 10920 Via Frontera, Suite 300, San Diego, CA 92127 Phone: (858) 674-5400	PROJECT TRACKING NO.: 68361-114 DSA APPLICATION NO.: STAMP DATE:
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STUDIOWC
 515 Encinitas Boulevard, Suite 201, Encinitas, CA 92024
 (760) 753-6800

ARCHITECT: STUDIOWC  <hr/> Robert D. Webb, Architect, C-28036	
ELECTRICAL ENGINEER: JOHNSON CONSULTING ENGINEERS  <hr/> Monica Goese Hansen, Engineer, E-14781	

END OF PROJECT TITLE PAGE

IDENTIFICATION STAMP
 DIV. OF THE STATE ARCHITECT

04 119164
 ACS 2, FLS fb SS 2
 DATE 3/12/2020
 ACS: S. CRLE
 FLS: f. burtee
 SSS: G. CHAN

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01 00 00

GENERAL REQUIREMENTS

SANTEE SCHOOL DISTRICT

SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY

- A. Project: Sycamore Canyon School Modular Addition, Santee School District.
- B. Description of Work: Construction of new 40'x36' and 40'x72' modular buildings, new 20'x30' fabric shade structure, concrete building foundations, mass and finish grading, site utilities, and misc site work as indicated in the Contract Documents prepared by StudioWC.

1.02 PERFORMANCE REQUIREMENTS

- A. All work shall conform to 2019, Title 24, California Building Code (CBC).
- B. Changes to the approved Drawings and Specifications shall be made by addenda or a construction change document (CCD) approved by the Division of the State Architect, Office of Regulation Services, as required by Section 4-338, Part 1, Title 24, California Building Code.

1.03 WORK UNDER OTHER CONTRACTS

- A. No work is planned or scheduled to be performed by the Owner's own forces.

1.04 WORK SEQUENCE

- A. Work is to be conducted in a single phase based on a single lump-sum contract. All work shall be completed within ninety (90) calendar days after the date of commencement of work stipulated in the Notice to Proceed. The contract closeout procedure as specified in Section 01 77 00 - Closeout Procedures shall be completed within this period. Normal inclement weather for the various seasons of the year shall not be grounds for extensions of contract time, and the Contractor shall take this into account when formulating his Construction Schedule. By submitting a Bid and entering into this Contract, Contractor certifies that he has adequate resources and is fully capable of completing the Work within the allotted time.

1.05 CONTRACTOR USE OF PREMISES

- A. During the construction period the Contractor shall have full use of the premises for construction operations, including use of the site. The Contractor's use of the premises is limited only by the Owner's right to perform construction operations with its own forces or to employ separate contractors on portions of the project.
- B. Limit use of the premises to construction activities in areas indicated; allow for Owner occupancy and use by the public.
 - 1. Confine operations to areas within Contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.

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- C. Keep driveways and entrances serving the premises clear and available to the Owner and the Owner's employees at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.

- D. Use of the Existing Buildings: Maintain the existing buildings in a weather-tight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.

1.06 OCCUPANCY

- A. At each phase of completion, the Owner will occupy the Project in the manner outlined in Section 01 77 00 - Closeout Procedures, and as set forth in the General Conditions. Refer to General Conditions of the contract, Article 1.02. B. (Occupancy) and Article 1.02. C. (Completion) for occupancy and completion conditions.

Partial Owner Occupancy: The Owner reserves the right to occupy and to place and install equipment in completed areas of the building, prior to Substantial Completion provided that such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.

- 1. A Certificate of Substantial Completion will be executed for each specific portion of the Work to be occupied prior to Owner occupancy.
- 2. Obtain a Certificate of Occupancy from local building officials prior to Owner occupancy.
- 3. Prior to partial Owner occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy the Owner will provide operation and maintenance of mechanical and electrical systems in occupied portions of the building.

PART 2 - PRODUCTS
(Not Applicable)

PART 3 - EXECUTION
(Not Applicable)

END OF SECTION

SECTION 01 21 00

ALLOWANCES

PART 1 - GENERAL

1.01 SUMMARY

- A. Include in the Contract Sum all allowances stated in the Contract Documents.
- B. Related Documents:
 - 1. Drawings, Specifications, and General Provisions of the Contract.

1.02 ALLOWANCES FOR PRODUCTS

- A. The amount of each allowance includes:
 - 1. The cost of the product to the Contractor, less any applicable trade discounts.
 - 2. Delivery to the site.
 - 3. Labor for installation.
 - 4. Applicable taxes.
- B. In addition to the amount of each allowance, include in the Contract Sum the Contractor's costs for:
 - 1. Handling at the site, including unloading, uncrating, and storage.
 - 2. Protection from the weather and from damage.
 - 3. Labor for installation and finishing.
 - 4. Other expenses required to complete the installation.
 - 5. Contractor's and Subcontractor's overhead and profit.

PART 2 - PRODUCTS

2.01 LUMP SUM ALLOWANCES

PART 3 - EXECUTION

3.01 SELECTION OF PRODUCTS

- A. The Architect will:
 - 1. Consult with the Contractor in consideration of products and suppliers or installers.
 - 2. Make selection in consultation with the Owner. Obtain Owner's written decision, designating:
 - a. Product, design and finish.
 - b. Accessories and attachments.
 - c. Supplier and installer as applicable.
 - d. Cost to Contractor, delivered to the site or installed, as applicable.
 - e. Manufacturer's warranties.
- B. The Contractor shall:

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1. Assist Architect and Owner in determining qualified suppliers or installers.
2. Obtain proposals from suppliers and installers when requested by Architect.
3. Make appropriate recommendations for consideration of the Architect.
4. Notify Architect promptly of:
 - a. Any reasonable objections Contractor may have against any supplier or party under consideration for installation.
 - b. Any effect on the Construction Schedule anticipated by selections under consideration.

3.02 CONTRACTOR RESPONSIBILITY

- A. On notification of selection, execute purchase agreement with designated supplier.
- B. Arrange for and process Shop Drawings, product data and samples, as required.
- C. Make all arrangements for delivery.
- D. Upon delivery, promptly inspect products for damage or defects.
- E. Submit claims for transportation damage.
- F. Install and finish products in compliance with requirements of referenced specification sections.

3.03 ADJUSTMENT OF COSTS

- A. Should the net cost be more or less than the specified amount of the allowance, the Contract Sum will be adjusted accordingly by Change Order. The amount of the Change Order will recognize any changes in handling costs at the site, labor, installation costs, overhead, profit, and other expenses caused by the selection under the allowance.
- B. Submit documentation for actual additional costs at the site, or other expenses caused by the selection under the allowance, within 60 days after completion of execution of the work. Failure to submit claims within the designated time will constitute a waiver of claims for additional costs.
- C. At contract closeout, reflect all approved changes in contract amounts in the final statement of accounting.

END OF SECTION

SECTION 01 22 00

UNIT PRICES

PART 1 - GENERAL

1.01 SUMMARY

- A. Contractor shall quote unit prices for additions or deductions of items of work as stated below.

1.02 UNIT PRICES

- A. All unit prices quoted shall be for installed, completely finished and operable units or systems unless otherwise indicated and shall include overhead and profit, taxes, etc., so that they represent the complete price to the Owner.
- B. It is hereby established that those unit prices shall not apply to work which the Contractor may elect to do or not to do, for the sake of his own convenience, nor shall they apply to work required to be performed in order to correct errors committed by the Contractor.
- C. All unit prices shall be valid and in force during the life of the construction contract and shall be reconciled with the total construction cost, in accordance with the Contract Documents and before filing of the Notice of Substantial Completion.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All products listed for unit prices are subject to the inspection and replacement of water damaged materials and equipment.
- B. Provide unit prices for the products listed in the Bid Form.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Review with the Inspector on unit price quantities and procedures for counting.
- B. The Architect will review the Inspector's findings and review with the School District. A Change Order will be issued establishing the extra work to be performed using the unit prices provided at time of Bid.

3.02 CONTRACTOR RESPONSIBILITY

- A. When given Notice to Proceed with extra work; order materials and proceed with the installation in accordance with the approved Change Order.
- B. At contract close out, reflect all approved changes in contract amount in the final statement of accounting.

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Administrative and procedural requirements for Alternates.
- B. Perform work required for complete execution of each accepted alternate designated in the Owner-Contractor Agreement. Amount of alternate prices shall include cost of modifications made necessary including overhead and profit.
- C. Work for alternates shall comply with applicable provisions of the contract documents, except as otherwise specified herein.
- D. Notification: Immediately following the award of the Contract, prepare and distribute to each party involved, notification of the status of each alternate. Indicate whether alternates have been accepted, rejected or deferred for consideration at a later date. Include a complete description of negotiated modifications to alternates.
- E. Schedule: Specification Sections referenced in the list of alternates contain requirements for materials and methods necessary to achieve the Work described under each alternate.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation whether or not mentioned as part of the alternate.

1.02 COORDINATION

- A. Coordinate pertinent related work and modify surrounding work as required to complete the project under each accepted alternate designated in the Owner-Contractor Agreement.

1.03 DEDUCTIVE ALTERNATES:

- A. Refer to BID FORM for alternates.
- B. All BID FORM ALTERNATES shall be bid, or the bidder may be deemed a "non-responsive" bidder.

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: General requirements for the proposal of substitutions.

1.02 MATERIAL

- A. Equipment, materials, and articles incorporated into the work shall be new and suitable for the purposes intended.
- B. Reference to equipment, material, article, or patented process by trade name or catalog number shall not be construed as limiting competition.
1. In cases where the Specifications designate a material, product, thing, or service by specific proprietary brand or trade name, and there is only one brand or trade name listed, the item involved is:
- a. Used as a standard of quality which must be satisfied without compromise, or
- b. The only brand or trade name known to the Owner and Architect.
2. Wherever in the Contract Documents a material, article, or process is indicated or specified by trade, patent, proprietary name, or name of manufacturer, such indication shall be deemed to be followed by the words, **"or equivalent, as accepted in writing by the Architect"**.
- a. Contractor shall submit a substitution request for Architect's written acceptance.
3. If the phrase "NO SUBSTITUTIONS" is used, the product is required to be used since it is a unique product application.
- C. The naming of more than one manufacturer in a Section does not imply that all products of named manufacturers are acceptable for use on the Project. Where more than one proprietary name is specified, provide materials or equipment of any one of the manufacturers specified, only if full compliance with other portions of the Specifications can be provided.
- D. Construction shall be in compliance with the cited standards for the materials specified.

1.03 SUBSTITUTIONS

- A. Should the Contractor wish to substitute an item purported to be equal to the one specified, then the Contractor shall, no later than 10 days after Award of Contract, furnish to the Architect the name of the manufacturer, model number, color options and other pertinent data and information respecting the "or equivalent" item which has been proposed in the bid and which the Contractor contemplates incorporating in the work. If the "or equivalent" item is not found by the Architect to be, in fact, equivalent or better, then the item specified in the Contract Documents shall be furnished.

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When colors have been indicated prior to Bid, Contractor shall be required to provide a custom color to match. See Section 01 33 00, Submittal Procedures.

- B. When required by the Contract Documents, or when directed by the Owner, furnish full information concerning the material or article proposed for incorporation into the work. Testing of a proposed substitute material to assure compliance with the Specifications may be required by the Owner at the Contractor's expense. When so directed, submit samples for acceptance. Equipment, material, and articles installed or used without required acceptance shall be at the risk of subsequent rejection, and replacement at Contractor's cost.
- C. Substitutions shall comply with, or exceed, requirements of dimension, function, structure, durability, and appearance without exception. Use of accepted substitutions shall in no way relieve the Contractor from responsibility for compliance with the Contract Documents after installation. It shall be incumbent upon the Contractor using accepted substitutions to assume extra costs caused by the use of such substitutions where they affect other work.
- D. Do not substitute materials, equipment, or methods unless such substitution has been reviewed and approved by the Architect. **Substitutions shall be submitted to the Division of the State Architect for approval prior to acceptance by Architect. Contractor is responsible for all costs associated with this substitution submittal. If said substitution is not accepted by the Division of the State Architect, the contractor shall provide the originally specified item at no cost to the owner and no impact to the project schedule.**
- E. "Or Equivalent":
 - 1. Where the phrase "or equivalent", "or approved equivalent", or "or equivalent as approved by the Architect" occurs in the Contract Documents, do not assume that materials, equipment, or methods will be accepted as equal unless the item has been specifically accepted, in writing, for the Work by the Architect **and by the Division of the State Architect for items which "affect health, safety or welfare" prior to installation or fabrication. Contractor is responsible for all costs associated with this substitution submittal. If said substitution is not accepted by the Division of the State Architect, the contractor shall provide the originally specified item at no cost to the owner and no impact to the project schedule.**
- F. Failure to place orders for specified equipment or material sufficiently in advance of the scheduled installation date will not be considered a valid reason upon which the Contractor may base his request for substitutions or for deviations from the Drawings and Specifications.
- G. In the event the Contractor requests changes or revisions requiring drawings or services of the Architect or the Architect's consultants, to facilitate installation or erection of any portion of the work, the Contractor shall accept the responsibility to hire and pay for the Architect's or Consultant's services. A standard hourly rate of \$150.00, shall be paid by the Contractor whether the change is accepted or rejected. In the event the change is approved, this fee shall be deducted, and paid, from the Contract Sum.
- H. Redesigning by the Contractor: Redesigning shall be by an Engineer licensed, in the State of California, to perform such work and approved the architect of record. Review of any optional redesigning by contractor by the architect shall be paid by the contractor at a standard hourly rate of \$150.00, whether the change is accepted or rejected. In the event approval is required from authorities having jurisdiction, such approval shall be

obtained by the Contractor at the Contractor's expense before submitting the revised design or substitution to the Architect. **Contractor is responsible for all costs associated with this substitution submittal. If said substitution is not accepted by the Division of the State Architect, the contractor shall provide the originally specified item at no cost to the owner and no impact to the project schedule.**

- I. Revision after Approval: When a submittal has been reviewed by the Architect, resubmittal for substitution of materials or equipment will not be considered unless accompanied by an explanation acceptable to the Architect as to the reason substitution is considered necessary. Changes in Plans and Specifications, which effect safety, health or welfare, shall be made by Addenda or Construction Change Document approved by the Division of the State Architect. **Contractor is responsible for all costs associated with this substitution submittal. If said substitution is not accepted by the Division of the State Architect, the contractor shall provide the originally specified item at no cost to the owner and no impact to the project schedule.**

1.04 SUBSTITUTION REQUEST FORM:

- A. Submittal of the requested information shall be accompanied by the attached Substitution Request Form. Submit a digital (PDF) of each request to the Architect. Architect will distribute as appropriate. Substitutions will be rejected if they are not accompanied by a completed Substitution Request Form. Incomplete forms will constitute automatic rejection. **Contractor is responsible for all costs associated with this substitution submittal. If said substitution is not accepted by the Division of the State Architect, the contractor shall provide the originally specified item at no cost to the owner and no impact to the project schedule.**
- A.

PART 2 - PRODUCTS
(Not Applicable)

PART 3 - EXECUTION
(Not Applicable)

END OF SECTION

ATTACHMENT: Substitution Request Form

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SUBSTITUTION REQUEST FORM

Re: _____
Project Name

Project Manual Section Number

Item

To: _____
Architect

From: _____
Contractor

Reviewed for timeliness and completeness by General Contractor:

We hereby submit for your consideration the following product comparisons of the specified item and the proposed substitution:

A.	Comparison	Specified Item	Substitution
	1. Product Name/Model	_____	_____
	2. Manufacturer	_____	_____
	Address	_____	
	Address	_____	
	Phone Number	_____	
	3. Product Cost	_____	
	Installation/Labor Cost	_____	
	4. Delivery Time	_____	
	Installation Time	_____	
	5. Product Characteristics	_____	
	6. Dimensions	_____	
	Effects	_____	
	7. Guarantee/Warranty	_____	
	8. ICC No.	_____	
	9. UL Rating	_____	

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B. Substantiating Data:

Attach manufacturer's literature for both specified item and substitution.

C. Samples: Provide samples for both specified item and substitution, if applicable.

D. Similar Projects for Reference:

1. _____
Name Date

Address

Address

Contact

Telephone

2. _____
Name Date

Address

Address

Contact

Telephone

E. Maintenance Service/Parts/Supplier:

Name

Address

Address

Telephone

F. What effect does this substitution have on applicable code requirements?

G. Change Data:

Attach complete information for changes to be made to Drawings and Project Manual.

- * Certification of equal performance and assumption of liability for equal performance.
- * The Contractor shall agree to pay for costs involved in changing the building design; including engineering, drafting and detail cost caused by the proposed substitution.

Submitted by:

Signature

Name

Title

Firm Name

Date

Address

Address

City State Zip

Telephone

Remarks:

Signature must be by persons having authority to legally bind his firm to the above terms. Failure to provide legally binding signature will result in retraction of approval.

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Product substitution of _____

for _____

Specifications Section _____
(number) (name)

For Use by Owner's Representative:

- Accepted Not Accepted

Owner's Consultant:

By: _____

Date: _____

- Accepted Not Accepted

School District:

By: _____

Date: _____

SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Administrative and procedural requirements governing the Contractor's Applications for Payment.
- B. Related Work:
 - 1. The Construction Progress Schedule is included in Section 01 32 16 and shall be coordinated with the work of this Section.
 - 2. **PROJECT RECORD DOCUMENTS:** All requirements for record documents, Specification Section 01 78 39, shall be completed to the Owner's satisfaction prior to Owner's processing of each month's Application for Payment.

1.02 SCHEDULE OF VALUES

- A. Coordinate preparation of the Schedule of Values with preparation of the Network Analysis Schedule.
- B. Submit the Schedule of Values to the Architect at the earliest feasible date, but in no case later than 7 days before the date scheduled for submittal of the initial Application for Payment. Include with initial submission a projected monthly payment request schedule for total cost of project, for Owner's cash flow planning.
- C. Acceptance of the Schedule of Values by the Architect and the District is required prior to approval and payment of the first application for payment.
- D. Format and Content: The Project Manual Table of Contents may be used as a general guide to format the Schedule of Values; specific item numbers may be sequentially numerical.
 - 1. The Schedule of Values shall be a detailed breakdown of the price to provide and install each item of work and material on the project.
 - 2. Each line item on the Schedule of Values shall be presented to allow the Architect to easily find that item of work within the construction during his review of the construction operations and evaluate whether that line item is 100% complete or not.
 - 3. Each line item of the Schedule of Values shall be given a value by the Contractor that, in the opinion of the Contractor, best represents the value of that work, and if required to present evidence of his opinion, the Contractor will be able to substantiate the value by the use of supplier, subcontractor written quotations, labor wages/rates, hourly estimates and/or by industry recognized cost estimating references.

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4. Each line item of the Schedule of Values shall be in such detail and coordinated with other line items of work and with the contractor's Construction Schedule, that when making application for payment each month, each line item depicts a portion of work that can be completed within one month's pay period, reviewed by the Inspector and the Architect; if that line item is 100% complete, recommended to the Owner for payment. If, in the opinion of the Architect, the line item is not 100% complete, the line item will not be recommended for payment.
5. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed. Each sheet of the Schedule of Values shall be titled and numbered sequentially.
 - a. Line Item Number
 - b. Description of Item.
 - c. Quantity.
 - d. Unit of Measure.
 - e. Unit Price.
 - f. Value of Line Item.
 - g. Line Item Value Request this month.
 - h. Line Item Value previously completed.
 - i. At the bottom of each sheet, the Total Amount of Columns f, g, and shall be tabulated and carried forward on each page and the TOTAL AMOUNT presented at the end.
- E. Round amounts off to the nearest whole Dollar; the total shall equal the Contract Sum.
- F. Schedule Updating: Update and resubmit the Schedule of Values when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.03 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.
 1. The initial Application for Payment, the Application for Payment at the time of Substantial Completion, and the final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is the 15th day of each month. The period of construction Work covered by each Application for Payment is the period ending 15 days prior to the date for each progress payment and starting the day following the end of the preceding period.
- C. Payment Application Forms: Use AIA Document G702 and the form of Schedule of Values accepted by the Architect and approved by the District.

- D. Application Preparation: Complete each entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the Owner. Incomplete applications will be returned without action.
1. Entries shall match data on the Network Analysis Schedule. Use updated schedules if revisions have been made.
 2. Include amounts of Owner-approved Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.
- E. Transmittal: Submit three (3) executed copies of each Application for Payment to the Architect by means of ensuring receipt within 24 hours; one copy shall be complete, including waivers of lien and similar attachments, when required.
1. Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to the Architect.
- F. Waivers of Mechanics Lien: With each Application for Payment, submit waivers of mechanics lien from entity who may lawfully be entitled to file a mechanics lien arising out of the Contract, and related to the Work covered by the payment.
1. Submit each Application for Payment with the Contractor's waiver of mechanics lien for the period covered by the Application.
 2. Submit final Application for Payment with or precede by final waivers from entity involved with performance of Work covered by the application who could lawfully be entitled to a lien.
- G. Initial Application for Payment: Administrative actions and submittals that must precede submittal of the first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's Construction Schedule.
 4. Schedule of unit prices, if applicable.
 5. Submittal Schedule.
 6. Copies of permits as may be required to start the Work (encroachment permits, etc., may be obtained as necessary for sequence of construction).
 7. Copies of authorizations and licenses from governing authorities for performance of the Work.
 8. Initial progress report.
 9. Report of pre-construction meeting
 10. Certificates of insurance and insurance policies.

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11. Performance and payment bonds.

Note: Each preceding item shall be submitted to the Architect, accepted by the Architect and approved by the Owner prior to the certification and approval of the first payment to the Contractor.

- H. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work. Administrative actions and submittals that shall proceed or coincide with this application include:
 1. Occupancy permits and similar approvals.
 2. Warranties (guarantees) and maintenance agreements.
 3. Test/adjust/balance records.
 4. Maintenance instructions.
 5. Meter readings.
 6. Start-up performance reports.
 7. Change-over information related to Owner's occupancy, use, operation and maintenance.
 8. Final cleaning.
 9. Application for reduction of retainage, and consent of surety.
 10. Advice on shifting insurance coverages.
 11. Final progress photographs.
 12. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion. Each work item value shall be listed and the total amount deducted from amounts owed over and above the retention.
- I. Final Payment Application: Administrative actions and submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:
 1. Completion of Project closeout requirements.
 2. Completion of items specified for completion after Substantial Completion.
 3. Written assurance that unsettled claims will be settled.
 4. Written assurance that Work not complete and accepted will be completed without undue delay.
 5. Transmittal of required Project construction records to Owner.
 6. Certified property survey.
 7. Proof that taxes fees and similar obligations have been paid.

8. Removal of temporary facilities and services.
9. Removal of surplus materials, rubbish and similar elements.
10. Change of door locks to Owner's access.

PART 2 - PRODUCTS
(Not Applicable)

PART 3 - EXECUTION
(Not Applicable)

END OF SECTION

Attachments: Application and Certification for Payment – Form G702
Continuation Sheet – Form G702

APPLICATION AND CERTIFICATE FOR PAYMENT (G702)

TO: <SCHOOL DISTRICT> SCHOOL DISTRICT

PROJECT:

APPLICATION NO:

PERIOD TO:

PROJECT NO:

CONTRACT DATE:

CONTRACT FOR:

DISTRIBUTION TO:

<input type="checkbox"/>	OWNER
<input type="checkbox"/>	ARCHITECT
<input type="checkbox"/>	CONTRACTOR
<input type="checkbox"/>	FIELD
<input type="checkbox"/>	OTHER

PHONE:
FROM:

VIA ARCHITECT:

PHONE:

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract Continuation Sheet, A/A Document G703, is attached.

1. ORIGINAL CONTRACT SUM	\$
2. Net Change by Change Orders & Extras	\$
3. CONTRACT SUM TO DATE	\$
(Line 1 + Line 2)	
4. TOTAL COMPLETED & STORED TO DATE	\$
(Column G on G703)	
5. RETAINAGE:	
a. ____ % of Completed Work ...\$	
b. ____ % of Stored Material	\$
Total Retainage (Line 5a + 5b)	
Total in Column I of G703	\$
6. TOTAL EARNED LESS RETAINAGE	\$
(Line 4 less Line 5 Total)	
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT	\$
(Line 6 from prior Certificate)	
8. CURRENT PAYMENT DUE	\$
9. BALANCE TO FINISH, INCLUDING RETAINAGE	\$
(Line 3 less Line 6)	

CHANGE ORDER SUMMARY	
Total changes approved in	
Previous months by Owner	\$
Total approved this month	\$
NET CHANGES by Change Order	\$

State of _____ County of _____
 Subscribed and sworn to before me this _____ day of _____, 20____.
 Notary Public: _____ My Commission Expires: _____

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: _____ Date: _____

INSPECTOR:

By: _____ Date: _____

OWNER:

By: _____ Date: _____

AMOUNT CERTIFIED\$

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

CONTINUATION SHEET (G703)

PROJECT:

APPLICATION NO:
PERIOD TO:

CONTRACT DATE:
CONTRACT FOR:

A ITEM NO.	B DESCRIPTION OF WORK	C SCHEDULED VALUE	D WORK COMPLETED		E THIS PERIOD	F MATERIALS PRESENTLY STORED (NOT IN D OR E)	G TOTAL COMPLETED AND STORED TO DATE (D+E+F)	H BALANCE TO FINISH (C-G)	I RETAINAGE
			FROM PREVIOUS APPLICATIONS (D+E)	% (G+C)					
TOTAL PAGE 1									

SECTION 01 31 13

PROJECT COORDINATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Administrative and supervisory requirements required to ensure orderly progress and timely completion of the Work.
- B. Related Work Described Elsewhere:
 - 1. Additional requirements for coordination are included on Contract Drawings and other Sections of the Specifications. It is intended that all work provided under this Contract shall be complete except where otherwise specified or shown. Any drawing, document, or section, by itself, is not a complete description of the work. Cross references to related work, where given, are provided as a convenience and shall not limit the applicability of other requirements specified or shown unless specifically stated.

1.02 QUALITY ASSURANCE

- A. Familiarity With Contract Documents:
 - 1. Contractor and all Subcontractors shall conduct a study necessary to become completely familiar with all requirements. Applicable requirements indicated or described in the Contract Documents, and the publications referred to, are a part of the Work required as though repeated in each such Section.
 - 2. In the event discrepancies or conflicts are encountered, notify the Architect immediately. Where there is discrepancy between different parts of the contract documents, including referenced codes and standards, the documents requiring the higher quality, the greater quantity, or the more difficult work shall govern, unless determined otherwise by the Architect.
 - 3. Promptly distribute required information to entities concerned and ensure the needed actions are taken.
- B. Reporting: Unless otherwise noted by the Contractor in his transmittals, all of the Contractor's data transmittals to the Architect for the Architect's review will be construed as stipulating that the Contractor has thoroughly and completely reviewed and coordinated the data prior to transmittal.
- C. Interfacing: It shall be solely the responsibility of the Contractor to make sure that each Subcontractor completes in a timely manner the assigned work and that all interfaces are prepared, connected, and function as required.

1.03 REQUEST FOR INFORMATION

- A. The General Contractor shall plan, schedule, coordinate and sequence Work so Requests for Information (RFI), if necessary, may be submitted to the Architect in a timely manner so as not to delay progress of Work. Submission of and responses to RFI(s) with copies to Owner, shall be transmitted via email.

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- B. Telephone conversations requesting information shall be confirmed in writing for prompt reply of all RFIs. Contractor shall coordinate the timing of email and telephone conversations to be made with the Architect's office between the hours of 8:00 a.m. and noon, Monday through Friday.
- C. RFI will be unanswered until Contractor submits a "Construction Schedule". "Construction Schedule" shall be based on Specification Section arrangement, and establish starting and ending dates for Work in each section. "Construction Schedule" shall be updated monthly and delivered to Architect and Owner at "Request for Payment".
- D. If "Construction Schedule" is not received by Architect and Owner by that date, Architect's response to pending RFI(s) will be delayed by the same number of days as the days the "Construction Schedule" is late.
- E. Architect shall have the same time period to respond to RFI(s) as "shop drawing review period". When the response to a Request for Information is already contained or included within contract documents, or is based on referenced standards, or is based on established and common construction practices, Contractor shall reimburse the Architect at the following hourly rates:

Principal.....	\$200.00/hour
Associate Architect/Project Manager	\$150.00/hour
Project Architect	\$ 95.00/hour
CADD.....	\$ 85.00/hour
Job Captain.....	\$ 75.00/hour
Draftsperson	\$ 65.00/hour
Support Staff.....	\$ 55.00/hour

If RFI requires Architect's Consultant(s) acknowledgment, Contractor shall reimburse consultant(s), at the same hourly rates for consultant's staff; Contractor shall also pay to the Architect, a percentage for overhead and profit to the consultant's fee, equal to the markup the General Contractor adds to "Change Orders" from his "Subcontractors".

- F. Contractor shall be billed at "Request for Payment" meeting, and payment is due on the 10th day of the following month. If payment is not received by Architect by that date, Architect's response to pending RFI's will be delayed by the same number of days as the days the payment check for RFI services is late.
- G. No damages for delay due to RFI response beyond allotted time will be allowed, unless Contractor can show that RFI was not foreseeable with proper planning, scheduling, coordination, and sequencing and the Architect's late response delayed timely purchase or delivery of equipment or material, or limited construction personnel from proceeding with their task(s), within previously listed "Construction Schedule" activity period(s).

**PART 2 - PRODUCTS
(Not Applicable)**

PART 3 - EXECUTION

3.01 PLANNING THE WORK

- A. By thorough advance planning of activities, coordinate the following in addition to other coordination activities required:
 - 1. Materials, services, and equipment purchasing.

2. Shipping.
3. Receipt and storage at the site.
4. Installation, including interface with related items.
5. Inspection and testing, to the extent required under the Contract.
6. Assistance in initial start-up and operational tests.
7. Completion of the Work, including removal and disposal of Contractor's surplus material and equipment, and final cleaning of structures and sites.

3.02 COORDINATION

- A. Coordinate construction activities included under various Sections of these Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work.

3.03 GENERAL INSTALLATION PROVISIONS

- A. Coordination methods used by the Contractor are at the Contractor's option, except that the Architect may disapprove Work completed by the Contractor or data submitted by the Contractor when, in the Architect's judgment, coordination has been inadequate to ensure the specified quality.
- B. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.

END OF SECTION

Attachment: Request for Information – Form RFI

REQUEST FOR INFORMATION (RFI)

SCHOOL NAME - PROJECT NAME

NOTE: AN RFI IS A REQUEST FOR INFORMATION ONLY. IF A REPLY TO AN RFI REQUIRES ADDITIONAL SERVICES BY A DESIGN CONSULTANT, OR WILL CHANGE SCOPE OF WORK OR CONTRACT TIME, SUBMIT PROPOSAL REQUEST IN ACCORDANCE WITH SECTION 01 25 00.

RFI #: _____

To: _____ Date: _____
Architect: _____ Project No.: _____
Address: _____ Drawing Ref.: _____
Phone: _____ Fax: _____ Spec. Sect. Ref.: _____
Email: _____

POSSIBLE COST IMPACT

TIME IMPACT

PRIORITY ATTENTION REQUIRED

Subject: _____

INFORMATION REQUESTED: (Attach additional sheets as required)

PLEASE RESPOND BY: _____ TRANSMITTED BY: _____

RESPONSE: (Attach additional sheets as required)

RESPONDED BY:

Name: _____ Company: _____ Date: _____

SECTION 01 31 19

PROJECT MEETINGS

PART 1 - GENERAL

1.01 SUMMARY

- A. Prior to commencement of the Work, a Preconstruction Conference will be held to discuss procedures to be followed during the progress of the Work.
- B. Location: A convenient site for all parties designed by the District.
- C. Attending the Preconstruction Conference shall be:
 - 1. District Representative
 - 2. District's Project Representative
 - 3. Architect
 - 4. District's and Architect's Consultants
 - 5. Contractor
 - 6. Contractor's Superintendent
 - 7. Major listed Subcontractors
 - 8. Others as appropriate

1.02 PROPOSED PROGRESS MEETINGS

- A. Schedule and hold weekly meetings or as required by the District Representative.
 - 1. Agenda to be prepared and submitted 48 hours prior to meeting.
- B. Location: A convenient site for all parties designed by the District.
- C. Attending Progress Meetings shall be:
 - 1. Contractor and/or fully delegated Representative
 - 2. Contractor's Superintendent
 - 3. Subcontractors, as appropriate to the Agenda.
 - 4. Others, as appropriate to the Agenda.
 - 5. Inspector of Construction
 - 6. District Representative
 - 7. Architect
- D. The Architect will record and distribute Meeting Minutes to the attendees. Attendees taking exception to anything in the meeting notes shall state same in writing, directed to the Architect within (5) five working days following receipt of meeting notes.

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: Manually prepared construction schedule based on Gantt (bar) Charts. Prepare and maintain schedules and issue reports to assure adequate planning and execution of the Work. Complete Work within the number of calendar days allowed in the Contract. Schedule shall be in sufficient detail to assist the Architect in appraising the reasonableness of the proposed schedule and to evaluate progress of the Work.

1.02 DEFINITIONS

- A. Day: As used throughout the Contract, the work "day" means "calendar day" unless otherwise indicated.
- B. Adverse weather that is normal for the area and the season shall be taken into account in the Construction Schedule.

1.03 QUALITY ASSURANCE

- A. Qualifications of Scheduling Personnel: Employ a project scheduler thoroughly trained and experienced in compiling construction schedule data and in preparation of periodic reports.
- B. Reliance Upon Accepted Schedule:
 - 1. The construction schedule, as accepted by the Architect, shall be an integral part of the contract and will establish interim Contract completion dates for various activities.
 - 2. Should any activity fail to be completed within 15 days after the stipulated schedule date, the Owner shall have the right to order the Contractor to expedite completion of the activity by whatever means the Owner deems appropriate and necessary, without additional compensation to the Contractor, and as set forth in the General Conditions of the Contract.
 - 3. Should any activity be 30 or more days behind schedule, the Owner shall have the right to perform the activity or have the activity performed by whatever method the Owner may deem appropriate, and as set forth in the General Conditions of the Contract.
 - 4. Costs incurred by the Owner in connection with expediting construction shall be deducted from the Contract amount.
 - 5. Failure by the Owner to exercise the option to either order the Contractor to expedite an activity or to expedite the activity by other means, will not be considered a precedent for any other activities nor a waiver of the Owner's rights to exercise his rights on subsequent occasions.

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1.04 SUBMITTALS**

- A. Submittal Procedure: Refer to Section 01 33 00 – Submittal Procedures and to Section 01 25 00 – Substitution Procedures.
- B. Preliminary Analysis: Within 10 days after receipt of notice to proceed, submit one reproducible copy and four prints of a preliminary Construction Schedule.
- C. Construction Schedule: Within 30 days after receipt of notice to proceed, submit one reproducible and four prints of the initial construction schedule.
- D. Periodic Reports: On the first working day of each month following submittal of the initial construction schedule, submit four prints of the updated Construction Schedule.

PART 2 - PRODUCTS

2.01 CONSTRUCTION ANALYSIS

- A. Graphically show the order and interdependence of activities necessary to complete the Work, and the sequence in which each activity is to be accomplished, as planned by the Contractor and his project field superintendent in coordination with all subcontractors whose work is shown on the diagram. Show all activities on the diagram. Each activity shall indicate work item breakdown noting duration and responsibility for each item, including, but not necessarily limited to:
 - 1. Project mobilization.
 - 2. Submittal and review of shop drawings and samples.
 - 3. Procurement of equipment and critical materials.
 - 4. Fabrication of special material and equipment. Installation and testing of each by item and by system.
 - 5. Final Cleanup.
 - 6. Final inspection and testing.
 - 7. Activities by the Architect that affect progress, required dates for completion, or both, for each part of the work.

PART 3 - EXECUTION

3.01 PRELIMINARY ANALYSIS

- A. Prepare a Preliminary Construction Schedule:
 - 1. Show all activities of the Contractor under this Contract for the period between receipt of notice to proceed and submittal of initial construction schedule.
 - 2. Show the Contractor's general approach to remainder of the Work.
 - 3. Show cost of all activities scheduled for performance before submittal and review of the Construction Schedule.

3.02 INITIAL CONSTRUCTION SCHEDULE

- A. Update the Preliminary Construction Analysis for use as the initial Construction Schedule:
 - 1. Clearly indicate the critical path and slack where it occurs.
 - 2. Meet with the Architect and review contents of proposed Construction Schedule.
 - 3. Make all revisions required by the Architect.

3.03 PERIODIC REPORTS

- A. On a monthly basis as specified above, submit updated Construction Schedule:
 - 1. Indicate "actual" progress in percent completion for each activity.
 - 2. Provide written narrative summary of revisions causing delay in the program. Explain corrective actions taken or proposed.
- B. Revise accepted construction schedule only when revisions are reviewed and approved in advance by the Architect.

END OF SECTION

SECTION 01 32 16.13

NETWORK ANALYSIS SCHEDULES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Computer generated construction scheduling based on CPM Network Analysis.

1.02 RESPONSIBILITY

- A. Be responsible for developing schedule logic with appropriate durations, manpower and cost data. Information shall be acceptable and compatible with the Owner's Master Schedule. Target completion and milestone dates generated shall be acceptable to the Owner.
- B. Adverse weather that is normal for the area must be taken into account in the Construction Schedule.
- C. Be responsible for providing a schedule meeting the contract agreement time of completion. The Owner requires the school facilities to be complete at the completion of Contract Agreement. A schedule that establishes completion prior to the end of Contract Agreement time will be considered for the Contractor's benefit only. Delays caused during construction that do not result in extensions of time beyond contract agreement time shall not be considered a cause for claim.

1.03 PROJECT INSPECTION

- A. The Owner will designate the time for a regular monthly update inspection at which time representatives of the Owner, Architect, and Contractor will inspect the Project and agree on progress of activities. The information so obtained shall be the basis for schedule update and monthly payments.

1.04 PROGRESS MEETINGS

- A. The Owner will designate time and location for a regular Monthly Progress Meeting at which principal parties shall attend. Current schedule, job progress, delays, projections, alternatives, cost report and payment applications to be among the priority items addressed in detail.

PART 2 - PRODUCTS

2.01 HARDWARE

- A. Provide microcomputer, along with required peripherals to be provided at the job site, for processing the Schedule and preparing reports.

2.02 SCHEDULING SOFTWARE

- A. Use a critical path based scheduling software program which is commercially available and commonly used in the construction industry for the preparation of graphic reports.

2.03 SCHEDULING PERSONNEL

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- A. Designate a Project Scheduler dedicated to scheduling responsibilities for this Work. Project Scheduler shall have had previous scheduling responsibilities on projects of equal size and complexity. Submit resume of the designated Scheduler for approval by Owner prior to the Notice To Proceed.

2.04 REPORTS REQUIRED

- A. Provide the following Reports:
1. Activity ID Report: Ordered by number in ascending order showing the activity description, early and late, start and finish dates, activity duration, per cent complete, and total float.
 2. Early Start Report: Sorted by building/area/early start/total float.
 3. Predecessor and Successor Analysis Report: Show activities and their predecessors and successors, relationship types and lag/lead time between activities.
 4. Network Logic Diagram: Drawn on 24" x 36" sized sheets, in a legible format, showing activities and relationships for construction activities.
 5. Bar Chart: Drawn in a legible format sorted by building or area and early start and showing activities occurring within the first 120 days of construction following the Notice To Proceed.
 6. Narrative: Provide a written narrative under the following circumstances:
 - a. To describe or explain logic changes.
 - b. To explain out of sequence progress.
 7. Construction Cost Report: This shall be produced based on the approved schedule of values for each building or area and other appropriate breakdowns.

2.05 REPORT SUBJECTS

- A. Reports required shall include cost updated, written narratives, network logic diagrams, graphic bar charts, in both detailed and summary format, and tabular printouts sorted and filtered as described hereinafter.
- B. Network Diagrams shall legibly show the order and interdependence of activities, and the sequence in which the work is to be accomplished as planned. Networks shall be drawn on 24" x 36" sized sheets with title, match data and date of latest version on each sheet.
1. A complete network diagram indicating current logic and activity durations shall be provided. A new updated network logic diagram will be required whenever material changes to the logic are made.
- C. Tabular printouts shall show one activity per line along with appropriate date for the purpose intended including various combinations of the following:
1. Activity ID
 2. Activity description
 3. Proceeding and succeeding activity ID's and descriptions

4. Original duration (in work days)
5. Revised duration (in work days)
6. Days remaining (in work days)
7. Per Cent complete and contract dollars paid
8. Earliest start date (by calendar date)
9. Earliest finish date (by calendar date)
10. Latest start date (by calendar date)
11. Latest finish date (by calendar date)
12. Actual start date (by calendar date)
13. Actual finish date (by calendar date)
14. Total Float

D. Activities shall include in addition to the construction activities, the submittal, review and approval of samples, manufacturer's date, and shop drawings, the procurement of materials and equipment, installation and testing. Any impact resulting from the operations of other contractors, or from operating restraints imposed by the Owner shall be identified in the network schedule. The selection and number of activities shall be subject to the Owner's approval.

1. Once activity data is acceptable to the Owner, permission may be granted to reduce certain routine Update Reports to reflect only the next 90 day period of activity.

E. Bar charts shall be required for summary purposes to compare actual progress per building/area with baseline schedule, and to indicate the effect of proposed logic changes and compression alternative.

F. Cost Reports shall be based on agreed completions for each work activity and be formatted to be consistent with the approved Schedule of Values.

2.06 SCHEDULE FORMAT

A. The detailed Network Schedule shall be developed using precedence or arrow format.

1. Durations shall be in working days and activities shall be of no greater duration than 20 days.
2. Activities shall be defined by profession/ trade/subcontractor.
3. Specific exceptions shall be approved by the architect/owner.

B. An appropriate monetary value is to be assigned to each work activity or group of activities by the Contractor and approved by the Owner. As the work progresses, each Schedule update shall provide the Owner with an updated cost report which will be the basis for approving application for payment. The Contractor may also resource load the Schedule based on manpower, materials and equipment by work activity, if he so chooses.

2.07 CONSTRUCTION COST REPORT

A. Within 30 calendar days following the Notice To Proceed, prepare and submit for approval a detailed, cost loaded construction schedule. Indicate information from subcontractors and suppliers, coordinate, and incorporate it into the detailed Construction Schedule. Relevant data shall be acquired, processed, submitted by the designated Project Scheduler. Reports submitted shall be accompanied by a certificate from the

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project scheduler that the data is current, complete, and representing the current network knowledge and values.

- B. The detailed construction schedule submitted by the Contractor shall:
1. Reflect complete sequence of construction by activity including:
 - a. Submittal and shop drawing activities for procurement packages and equipment.
 - b. Product procurement and delivery dates including long lead items.
 - c. Contractual milestone dates.
 - d. Dates for beginning and completion of each element of construction.
 - e. Disruptions and shutdowns due to other operations, facilities and functions.
 - f. Dates for installation and testing of equipment.
 - g. Cleanup
 - h. Contract start-up and closeout.
 2. Identify work of separate buildings, separate areas and other logically grouped activities.
 3. Show projected percentage of completion for each item of work as of the last day of each month.
 4. Provide special schedules to define critical portions of the entire Schedule as requested by Owner.
 5. Incorporate the procurement submittal Schedule.
 - a. Discrete activities shall be separated by trade or other category as requested by the Owner and separate activities shall be assigned activity numbers for use and monitoring.
 - b. Separate activities shall be reflected in a level of detail such that no activity shall be of greater duration than 20 days. Specific exceptions must be requested in writing.
 6. Provide complete and accurate cost reports.

PART 3 - EXECUTION

3.01 INITIAL SUBMISSION

- A. Within 10 days following the Notice to Proceed, submit a basic schedule indicating anticipated progress during the first 60 days following Notice to Proceed.
- B. The sixty-day plan shall be an initial logic network identifying overall activities, relationships and durations, and meeting owner defined milestones, and including a

calendar of holidays.

- C. Within 30 calendar days of receiving its Notice to Proceed, prepare and submit a detailed procurement and construction schedule integrating the 60-day schedule, for review and approval by the Owner. Emphasis shall be placed upon the procurement of equipment and materials. This schedule shall provide the following:
1. Appropriate tabular printouts and graphic reports provided to clearly show activity, logic relationships, activity durations, early and late start and finish dates, and total float.
 2. Complete details are required for work occurring within the following 120 days and sufficient detail for the balance of project to insure meeting completion criteria. When approved by the Owner, this Schedule is to be preserved and identified as the original Baseline Schedule.
 3. Activity code definition describing sub-elements of the activity identification or any other code values used for the purpose of sorting or grouping date.
 4. Cost reports consistent with the payment procedures and Schedule of Values approved by the Owner.

3.02 MONTHLY UPDATES

- A. Each month shall issue a revised detailed Construction Schedule consisting of tabular data and bar chart summaries, plus certified date which:
1. Shows changes occurring since the previous submission of updated schedule,
 2. Indicates progress of each activity and shows completion dates,
 3. Includes:
 - a. Major changes in scope and logic changes.
 - b. Activities modified since previous updating.
 - c. Identification of any slippage.
 - d. Revised projections due to changes.
 - e. Out of sequence progress.
 - f. Other identifiable changes.
 4. In the event that a revised detailed Schedule is not acceptable to the Owner, Schedule shall be revised and resubmitted until acceptable by the Owner.
- B. The monthly schedule submittal shall include the following reports:
1. Activity report sorted by activity.
 2. Critical activity report sorted by total float/early start.
 3. Cost report based on the agreed progress on each work activity or group of activities.
 4. Other reports as requested by the Owner.
- C. Network logic diagram produced on 24" by 36" paper shall show current data dates, activities whether complete or not, and the status of each. This diagram shall reflect

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reported construction progress and projected activity. The critical path is to be highlighted for ease of identification. The logic diagram shall be grouped by building and sub-grouped by logically related activities, such as Specification Division, responsibility, or area. Sheets of the network diagram that are unaffected by change since the previous issue need not be resubmitted.

- D. In the event that the Contractor fails to provide the required schedules, reports, or updates noted above in a timely manner, the Owner shall have the right to withhold progress payments until the scheduling documentation requirements of this Section are satisfied.

3.03 PROJECT CLOSEOUT

- A. As the project approaches completion, separate reports shall be submitted showing the sequence durations and dates for testing, adjusting, and commissioning items of equipment installed under this Contract. Both detailed and summary reports are required.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
1. Wherever possible throughout the Contract Documents, the minimum acceptable quality of workmanship and materials has been defined by manufacturer's name and catalog number, reference to recognized industry and government standards, or description of required attributes and performance.
 2. To help ensure that the specified products are furnished and installed in accordance with design intent, submit design product and data in advance for review by the Architect. Review by the Architect and the design consultants in no way relieves the contractor or subcontractor or supplier from providing the products or construction as described in the Contract Documents.
 3. Make submittals required by the Contract Documents. Revise and resubmit when requested to establish compliance with the specified requirements.
- B. Related Work Described Elsewhere: Additional requirements for submittals are described in other Sections of these Specifications and the General Conditions.
- C. Submittals shall be organized by specification section number.
- D. Submittals shall be complete. All items indicated in each submittal section shall be contained within the submittal and identified by the Part, Section and subsection.
INCOMPLETE SUBMITTALS WILL BE REJECTED AND ANY DELAY WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.

1.02 QUALITY ASSURANCE

- A. Coordination of Submittals: Prior to each submittal, review and coordinate each item being submitted and verify that each item and the submittal conform with the requirements of the Contract Documents. **By affixing the Contractor's signature to each submittal, certify that this coordination has been performed.**
- B. Certificates of Compliance:
1. Certify that materials used in the Work comply with specified provisions thereof. Certification shall not be construed as relieving the Contractor from furnishing satisfactory materials if, after tests are performed on selected samples, the material is found not to meet specified requirements.
 2. Show on each certification the name and location of the Work, name and address of Contractor, quantity and date or dates of shipment or delivery to which the certificate applies, and name of the manufacturing or fabricating company. Certification shall be in the form of letter or company-standard forms containing required data. Certificates shall be signed by an officer of the manufacturing or fabricating company.
 3. In addition to the above information, laboratory test reports submitted shall show

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the date or dates of testing, the specified requirements of which testing was performed, and results of the test or tests.

1.03 SUBMITTALS

- A. Contractor shall submit all shop drawings, samples, requests for substitutions, mix designs, and other items, in accordance with this Section. Submit schedule per Section 01 32 16, Construction Progress Schedule, indicating timing of all required submittals.
- B. Prior to submittal of the Contractor's first application for payment, submit a schedule of all submittals required by the Contract Documents.
- C. Submittals shall be submitted per the following time schedule for the following specific items. Failure to submit by these dates will be considered sufficient grounds to delay Architect's certification of Contractor's Application for Payment until these items are received in proper order.
 - 1. Within **10 calendar days** after Award of Contract:
 - a. **All Requests for Substitutions:** After this date, no further requests for substitution will be considered, and Contractor shall be obligated to provide the specified products - **NO EXCEPTIONS.**
 - 2. Within **15 calendar days** after Notice to Proceed:
 - a. Concrete mix design, steel connectors to be embedded in concrete foundations and slabs, materials for underground site plumbing, sewer, storm drainage, and underground site electrical.
 - 3. Within **20 calendar days** after Notice to Proceed:
 - a. Hollow metal, door hardware, fire alarm system, fire sprinkler system, glu-lam beams and other structural lumber, structural steel, miscellaneous structural connectors, mechanical, plumbing and electrical materials, and equipment and fixtures.
 - b. All materials requiring a color selection by the Owner and Architect.
 - c. All casework.
 - 4. Within **30 calendar days** after Notice to Proceed:
 - a. All other items not specifically mentioned in 1, 2 and 3 above.
- D. Provide required submittals for the following products to interface with other portions of the Work. Submit data to verify compliance only.
 - 1. For products specified only by reference standard, select product meeting that standard, by manufacturer.
 - 2. For products specified by naming several products or manufacturers, select one of the products or manufacturers named.
 - 3. For products specified by naming one or more products or manufacturers and stating "or other approved", or "or approved equivalent", or other such wording on

drawings or within specifications sections, submit a request for substitutions for product or manufacturer which is not specifically named, but only after submitting bid on specified products and systems.

PART 2 - PRODUCTS

2.01 SHOP DRAWINGS AND COORDINATION DRAWINGS

- A. Scale and Measurements: Make shop drawings to a scale sufficiently large to shown pertinent aspects of the item and its method of connection to the Work.
- B. Type of Prints Required: Submit shop drawings in the black and white PDF (Blue Beam Review compatible) format.
- C. Reproduction of Reviewed Shop Drawings: Printing and distribution of reviewed shop drawings for the Architect's use will be by the Architect.
- D. Review comments of the Architect will be shown in Blue Beam Review. The Contractor shall make and distribute copies required for his purposes.

2.02 MANUFACTURERS' LITERATURE

- A. General: Where submitted literature from manufacturers includes data not pertinent to the submittal, indicate which portion of the contents is being submitted for review. Submittals not clearly marked will be returned without review.
- B. Number of Copies Required: One digital PDF (Blue Beam Review compatible) copy.
- C. The Contractor shall make and distribute copies required for his purposes.

2.03 SAMPLES

- A. Accuracy of Samples: Precise article proposed to be furnished shall be labeled with a submittal number, and project name.
- B. Number of Samples Required: Submit quantity required to be returned plus one each retained by the Architect, the Inspector, D.S.A., and the Owner, unless otherwise noted.
- C. Reuse of Samples: In situations accepted by the Architect, the Architect's retained sample may be used in the construction as one of the installed items.
- D. Size of Samples: Samples shall be 6" x 6", or manufactured width by 12 inches, unless otherwise required by the pertinent Specification section.

2.04 COLORS AND PATTERNS

- A. When the precise color and pattern is not specifically described in the Contract Documents, and whenever a choice of color or pattern is available in a specified product, submit accurate color and pattern charts to the Architect for review and selection. Submit data to verify compliance only. If the color is specifically described in the Contract, submit only that color for verification and approval. Digital color submissions are acceptable within the submittal document, however, physical samples must be delivered within one day of date of submittal.

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PART 3 - EXECUTION

3.01 IDENTIFICATION OF SUBMITTALS

- A. General: Consecutively number submittals within the respective specification section. Accompany each submittal with transmittal cover letters attached to the end of this Section. Fill out each transmittal cover letter completely, number sequentially, include specification section, name of supplier or installer, and contact person and telephone number.
- B. Internal Identification: On the first page of each copy of each submittal, and elsewhere as required for positive identification, indicate the submittal number.
- C. Resubmittals: When material is resubmitted, transmit under a new letter of transmittal and with same submittal number plus a "alphabetic" suffix indicating its a re-submittal, e.g. 05500-1A, 05500-1B.
- D. Submittal Log: Maintain submittal log for the duration of the Contract. Show current status of submittals, with columns showing "approved", "approved as corrected", etc, to match Architect's categories. Make the submittal log available for the Architect's review upon request. Log shall be available and will be reviewed at each project meeting.

3.02 COORDINATION OF SUBMITTALS

- A. The Contractor's Project Engineer shall be responsible to coordinate and review all submittals prior to forwarding to Architect. All submittals shall be stamped with Contractor's stamp, signed and dated, stating:
 - 1. Contractor has reviewed submittal for compliance with requirements of the Contract Documents.
 - 2. Contractor has reviewed submittal for proper interfacing with other trades.
- B. General: Prior to making submittals, coordinate materials including, but not necessarily limited to:
 - 1. Determine and verify interface conditions, catalog numbers, and similar data,
 - 2. Coordinate with other trades as required,
 - 3. **Clearly indicate deviations from requirements of the Contract Documents. Deviations which are not clearly called out as a deviation and which subsequently become a part of an approved submittal can under no circumstances be considered legitimate grounds for an additive change order.**
- C. Grouping of Submittals: Make submittals in groups containing associated items to ensure that information is available for checking each item when it is received. Partial submittals may be rejected as not complying and the Contractor shall be strictly liable for occasioned delays.
- D. Color selections for materials in the same space or same elevation shall be submitted at one time. "Piece meal" submission of the color samples or charts is unacceptable and will be returned awaiting a "complete" submission.

3.03 TIMING OF SUBMITTALS

- A. General: Make submittals far enough in advance of dates scheduled for installation to provide time required for reviews; for possible revisions and resubmittals; and for placing orders and securing delivery, and as otherwise required by Part 1.03 of this Section.
- B. Architect's Review Time: In scheduling, allow at least 20 calendar days for review by the Architect following his receipt of the submittal or as otherwise may be required under each Specification section. Allow an additional 10 days for reviews involving Architect's consultants or as otherwise may be required under each Specification section.
- C. Delays: Delays caused by tardiness in making submittals or resubmittals will not be an acceptable basis for extension of the Contract completion time.

3.04 ARCHITECT'S REVIEW

- A. General: Corrections or comments made on Shop Drawings during his review **shall not relieve the Contractor from compliance with requirements of the Drawings and Specifications**. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. The Contractor is responsible for confirming and correlating quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of other trades and performing his work in a safe and satisfactory manner.
 - 1. Authority to Proceed: The notations "Furnish as Submitted" or "Furnish as Corrected" authorize the Contractor to proceed with fabrication, purchase, or both or the items so noted, subject to the revisions, if any, required by the Architect's review comments.
 - 2. Revisions: The notation "Revise and Resubmit" or "Submit Specified Item" means make revisions required by the Architect and resubmit. If the Contractor considers required revision to be a change, he shall so notify the Architect as provided for under "Changes" or "Changes in the Work" in the General Conditions. Show each drawing revision by number, date, and subject in a revision block on the drawing. Make only those revisions directed by or accepted by the Architect.
 - 3. Rejection: The notation "Rejected" means the submission does not meet requirements of project contract documents. Make new submission meeting project contract documents.

END OF SECTION

Attachment: Contractor's Form - Shop Drawings / Submittal Transmittal Letter
Cover Sheet referenced herewith.

SHOP DRAWINGS / SUBMITTAL TRANSMITTAL LETTER

School: Sycamore Canyon School	Specification Section:
Project: Modular Addition	Submittal No.:
District: Santee School District	Submittal Description:
DSA Application No.:	Date:

Contractor:	Subcontractor:
Address:	Address:
Phone No.:	Phone No.:
Contact:	Contact:

FIRM NAME

Address

Phone No.

SUBMITTAL HISTORY

ARCHITECT/ENGINEER'S SHOP DRAWING STAMP

REMARKS:

SECTION 01 35 16

ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Special procedures required for alteration work.

1.02 SCHEDULING

- A. Before commencing alteration or demolition work, submit for review by the Architect and approval of the Owner, a Schedule showing the commencement, the order and the completion dates for the various parts of this work.
- B. Before starting work relating to existing utilities (electrical, sewer, water, heat, gas, fire lines, etc.) that will temporarily discontinue or disrupt service to the existing building, notify the Architect and the Owner 72 hours in advance and obtain the Owner's approval in writing before proceeding with this phase of the work.

1.03 PROTECTION

- A. Make such explorations and probes as are necessary to ascertain required protective measures before proceeding with demolition and removal. Give particular attention to shoring and bracing requirements so as to prevent damage to existing construction.
- B. Provide, erect, and maintain catch platforms, lights, barriers, weather protection, warning signs, and other items as required for proper protection of the public, occupants of the building, workmen engaged in demolition operations, and adjacent construction.
- C. Provide and maintain weather protection at exterior openings so as to fully protect the interior premises against damage from the elements until protection is provided by new construction.
- D. Provide and maintain temporary protection of the existing structure designated to remain where demolition, removal and new work is being done, connections made, materials handled, or equipment moved.
- E. Take necessary precautions to prevent dust and dirt from rising by wetting demolished masonry, concrete, plaster and similar debris. Protect unaltered portions of the existing building affected by the operations under this Section by dustproof partitions and other adequate means.
- F. Provide adequate fire protection in accordance with local Fire Authority and with Section 01 50 00, Temporary Facilities and Controls.
- G. Do not close or obstruct walkways, passageways or stairways. Do not store or place materials in passageways, stairs, or other means of egress. Conduct operations with minimum traffic interference.
- H. Be responsible for damage to the existing structure or contents by reason of the insufficiency of protection provided.

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PART 2 - PRODUCTS

2.01 MATERIALS

- A. Materials and workmanship employed in the alterations, unless otherwise shown or specified, shall conform to that of the original work, or to new construction as specified elsewhere in these specifications.
- B. If interior finish materials, or existing surfaces to be removed are indicated to be re-used in areas necessary to match existing surfaces. Care in removal and stockpiling shall be exercised to ensure re-use.

PART 3 - EXECUTION

3.01 WORKMANSHIP

- A. Perform demolition, removal and alteration work with due care, including shoring and bracing. Be responsible for damage which may be caused by such work to part or parts of existing structures or items designated for re-use. Perform patching, restoration, and new work in accordance with applicable technical sections of the Specifications.
- B. Materials and items designated to become the property of the Owner shall be as shown. Remove such items with care, under the supervision of the trade responsible for reinstallation; protect and store until required. Replace material and item damaged in its removal with approved similar and equal new material.
- C. Materials and items demolished and not designated to become the property of the Owner or to be reinstalled shall become the property of the Contractor and shall be removed from the Owner's property. Storage or sale of removed items on site will not be permitted.
- D. Execute the work in a careful and orderly manner, with the least possible disturbance to the public and to the occupants of the building.
- E. Where alterations occur, or new and old work join, cut, remove, patch, repair or refinish the adjacent surfaces or so much thereof as is required by the involved conditions, and leave in as a good a condition as existed prior to the commencing of the work. The alteration work shall be performed by the various respective trades which normally perform the particular items of Work.
- F. Finish new and adjacent existing surfaces as specified for new work. Clean existing surfaces of dirt, grease, loose paint, etc. before refinishing.
- G. Where existing equipment and fixtures are indicated to be re-used, repair such equipment and fixtures and refinish to put in excellent working order. Refinish as directed.
- H. Cut out embedded anchorage and attachment items as required to properly provide for patching and repair of the respective finishes.
- I. Confine cutting of existing roof areas designated to remain to the limits required for the proper installation of the new work. Cut and fold back existing built-up roofing. Cut and remove insulation. Provide temporary weathertight protection as required until new roofing and flashings are applied.

- J. Should any existing conditions, such as deterioration or non-complying construction, be discovered which is not covered by the DSA approved documents, wherein the finished work will not comply with the current Title 24, California Building Code of Regulations, a construction change document, or a separate set of plans and specifications, detailing and specifying the required repair work, shall be submitted to, and approved by DSA, before proceeding with the repair work.

3.02 CLEANING UP

- A. Remove debris as the work progresses. Maintain the premises in a neat and clean condition.

END OF SECTION

SECTION 01 42 19

REFERENCE STANDARDS

PART 1 - GENERAL

1.01 SUMMARY

- A. Throughout the Contract Documents, reference is made to codes and standards which establish qualities and types of workmanship and materials, and methods for testing and reporting on the pertinent characteristics.
- B. Provide materials and workmanship which meet or exceed the specifically named code or standard.
- C. Deliver to the Architect required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard. Such proof shall be in the form requested by the Architect and will generally be required to be copies of a certified report of tests conducted by a testing agency acceptable for that purpose to the Architect.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Specific naming of codes or standards occurs on the Drawings and in other Sections of these Specifications. Comply with laws, ordinances, and regulations of authorities having jurisdiction. Proof of compliance with laws, ordinances, and regulations shall be by the signed approval of the respective authorities having jurisdiction. Costs relative thereto shall be borne by the Contractor.

1.03 QUALITY ASSURANCE

- A. Familiarity with Pertinent Codes and Standards: Verify the requirements of the specifically named codes and standards as well as requirements mandated by law, ordinance and authority. Verify that the items procured and installed in this Work meet or exceed the specified requirements.
- B. Rejection of Noncomplying Items: The Architect reserves the right to reject items incorporated into the Work which fail to meet such minimum requirements.

1.04 APPLICABLE CODES

- A. Work of the project shall conform to the following list of the **2019, Title 24, California Code of Regulations (CCR)**, a List of Codes, copies of which shall be maintained at the job site by the Contractor throughout the duration of the work.
- B. **Partial List of Applicable Codes as of January 1, 2020:**
 - 1. **2019 California Building Standards Administrative Code (CAC)**, Part 1, Title 24, California Code of Regulations (CCR).**
 - 2. **2019 California Building Code (CBC)**, Part 2, Title 24, California Code of Regulations (CCR) [2018 International Building Code (IBC) Volumes 1-2 and 2019 California Amendments].

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3. **2019 California Electrical Code (CEC)**, Part 3, Title 24, California Code of Regulations (CCR) [2017 National Electrical Code and 2019 California Amendments].
4. **2019 California Mechanical Code (CMC)**, Part 4, Title 24, California Code of Regulations (CCR) [2018 Uniform Mechanical Code and 2019 California Amendments].
5. **2019 California Plumbing Code (CPC)**, Part 5, Title 24, California Code of Regulations (CCR) [2018 Uniform Plumbing Code and 2019 California Amendments].
6. **2019 California Energy Code**, Part 6, Title 24, California Code of Regulations (CCR).
7. **2019 California Historical Building Code**, Part 8, Title 24, California Code of Regulations (CCR).
8. **2019 California Fire Code (CFC)**, Part 9, Title 24, California Code of Regulations (CCR) [2018 International Fire Code and 2019 California Amendments].
9. **2019 California Existing Building Code**, Part 10, Title 24, California Code of Regulations (CCR).
10. **2019 California Green Building Standards Code**, Part 11, Title 24, California Code of Regulations (CCR).
11. **2019 California Reference Standards Code**, Part 12, Title 24, California Code of Regulations (CCR).
12. Title 19, CCR, Public Safety, State Fire Marshal Regulations.
13. 2016 ASME A17.1 (w/A17.1a/CSA B44a-08 addenda) Safety Code for Elevators and Escalators.

C. Partial List of Applicable Standards:

Reference code section for NFPA Standards, 2019 CBC (SFM)

NFPA 13	Automatic Sprinkler Systems, 2019 Edition (CA Amended)
NFPA 14	Standpipes and Hose Systems, 2019 Edition (CA Amended)
NFPA 17	Dry Chemical Extinguishing Systems, 2017 Edition
NFPA 17a	Wet Chemical Extinguishing Systems, 2017 Edition
NFPA 20	Stationary Pumps for Fire Protection, 2019 Edition
NFPA 22	Water Tanks for Private Fire Protection, 2018 Edition
NFPA 24	Private Fire Service Mains & their Appurtenances, 2019 Edition
NFPA 25	Standard for Inspection, Testing & Maintenance of Water-based Fire Protection Systems, 2020 Edition

NFPA 37	Installation & Use of Stationary Combustion Engines & Gas Turbines, 2018 Edition
NFPA 72	National Fire Alarm & Signaling Code, 2019 Edition (CA Amended)
NFPA 80	Fire Doors and Other Opening Protectives, 2019 Edition
NFPA 92	Standard for Smoke Control Systems, 2018 Edition
NFPA 101	Life Safety Code, 2018 Edition
NFPA 110	Emergency & Standard Power Systems, 2019 Edition
NFPA 170	Standard for Fire Safety & Emergency Symbols, 2018 Edition
NFPA 221	Standard for High Challenge Fire Walls, Fire Walls & Fire Barrier Walls, 2018 Edition
NFPA 253	Critical Radiant Flux of Floor Covering Systems using a Radiant Heat Energy Source, 2019 Edition
NFPA 2001	Clean Agent Fire Extinguishing Systems, 2018 Edition
ICC 300	ICC Standards on Bleachers, Folding and Telescoping Seating and Grandstands, 2017 Edition
ICC-ES AC77	Acceptance Criteria for Smoke Containment Systems used with Fire-Resistance-Rated Elevator Hoistway Doors & Frames,
SFM Std. 12-10-1	Power Operated Exit Doors, 2019 Edition
SFM Std. 12-10-2	Single-Point Latching or Locking Devices, 2019 Edition
SFM Std. 12-10-3	Emergency Exit & Panic Hardware, 2019 Edition
SFM Std. 12-7A	Materials and Construction Methods for Exterior Wildfire Exposure, 2019 Edition
UBC Std. 15-2	Test Standard for Determining the Fire Retardancy of Roof-Covering Materials
UL 38	Manual Signaling Boxes for Fire Alarm Systems, 2008 Edition
UL 268	Smoke Detectors for Fire Protective Signaling Systems, 2009 Edition
UL 268A	Smoke Detectors Duct Applications, 2016 Edition
UL 294	Access Control Systems Units, 2018 Edition
UL 300	Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment, 2019 Edition
UL 305	Standard for Panic Hardware, 2012 Edition

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UL 346	Waterflow Indicators for Fire Protective Signaling Systems, 2016 Edition
UL 464	Audible Signal Devices for Fire Alarm & Signaling Systems, including Accessories, 2016 Edition
UL 521	Heat Detectors for Fire Protective Signaling Systems, 1999 Edition (Amended with Revision through July 20, 2005)
UL 864	Control Units and Accessories for Fire Alarm Systems, 2014 Edition
UL 2034	Single & Multiple Station Carbon Monoxide Alarms, 2017 Edition

Reference code section for NFPA Standards – 2019 CBC (SFM) Chapter 35. See Chapter 35 for State of California amendments to NFPA Standards

**** California Administrative Code, Part 1, Chapter 10, Administrative Regulations for the California Energy Commission (CEC).**

1.05 REFERENCE STANDARDS

- A. Standards referenced in the Specifications are usually referred to by the abbreviation of the organization's name and the designation of the document (e.g., ASTM A36). Documents in common use may be referred to by their own designation (e.g., the California Electrical Code is published by the National Fire Protection Association as NFPA-70 but is referred to as CEC, and is part of a series of documents or standards referred to as the National Fire Code). References are to the latest issue of the publication available on the date stipulated for the receipt of bids.

STANDARDS ORGANIZATIONS

AA	Aluminum Association
AAMA	American Architectural Manufacturer's Association
ASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association
AISC	American Institute of Steel Construction
AITC	American Institute of Timber Construction
AMCA	Air Movement and Control Association, Inc.
ANSI	American National Standards Institute, Inc.
APA	APA-The Engineered Wood Association
ARI	Air-Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers

ASTM	American Society for Testing and Materials
AWPA	American Wood Protection Association
AWPB	American Wood Preservers' Bureau
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
CBC	California Building Code, 2019
CDA	Copper Development Association
CEC	California Electrical Code
CEQA	California Environmental Quality Act
CGA	Compressed Gas Association
CISPI	Cast Iron Soil Pipe Institute
CMC	California Mechanical Code - See IAPMO
CPC	California Plumbing Code - See IAPMO
CPSC	Consumer Product Safety Commission
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standard of U.S. Dept. of Commerce
CTIOA	Ceramic Tile Institute of America (former CTI)
CSMA	Chemical Specialties Manufacturing Association
FGMA	Flat Glass Marketing Association
FM	Factory Mutual Global (former FMS)
FS	Federal Specification
GA	Gypsum Association
HI	Hydraulic Institute
HRI	Hydraulics Research Institute
IAPMO	International Association of Plumbing and Mechanical Officials
ICC	International Code Council (former ICBO)
IEEE	Institute of Electrical and Electronics Engineers

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IES	Illuminating Engineering Society of North America
MIL-STD	Military Specifications (former MIL)
ML/SFA	Metal Lath/Steel Framing Association
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry
NAAMM	National Association of Architectural Metal Manufacturers
NIST	National Institute of Standards and Technology (former NBS)
NEBB	National Environmental Balancing Bureau
NEMA	National Electrical Manufacturers Association
N FLUID PA	National Fluid Power Association
NFPA	National Fire Protection Association
NRCA	National Roofing Contractors Association
NSF	National Sanitation Foundation
NWWDA	National Wood Window and Door Association
PS	Voluntary Product Standard (of NIST former NBS)
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SDI	Steel Deck Institute
SJI	Steel Joist Institute
SSPC	The Society for Protective Coatings (former SSPC)
TCNA	Tile Council of North America, Inc. (former TCA)
TSIB	Technical Services Information Bureau (former WLPDIA)
UL	Underwriters Laboratories, Inc.
WI	Woodwork Institute (former WIC)
TITLE	Title 24, California Code of Regulations, Part 1, 2, 3, 4, 5, 6, 8, & 9
TITLE	Title 19, California Code of Regulations

1.06 REFERENCE COPIES

- A. A minimum of one copy of Codes, Regulations, and Standards referenced in the drawings or the specifications, or applicable to the work, shall be furnished to the Owner's Representative at least (2) two weeks prior to the commencement of work affected by such codes, regulations or standards.

PART 2 - PRODUCTS
(Not Applicable)

PART 3 - EXECUTION
(Not Applicable)

END OF SECTION

SECTION 01 45 23

TESTING AND INSPECTING SERVICES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Cooperate with the Owner's selected testing agency, the Owner's assigned Inspector, and others responsible for testing and inspecting the Work, and assist the Owner by coordinating such testing and inspecting services as specified in this Section and/or elsewhere in the Contract Documents.
- B. Related Work Specified Elsewhere:
 - 1. Requirements for testing may be required in other Sections of these Specifications.
 - 2. Where no testing requirements are specified or required by reference standards or authorities having jurisdiction, the Owner may require such testing to be performed under current pertinent standards for testing. Payment for such testing will be made as described herein.
- C. Work Not Included:
 - 1. The Owner will select a pre-qualified independent testing laboratory and Inspector as approved by the Division of the State Architect (DSA), Department of General Services, Architect and Structural Engineer.
 - 2. The Owner will pay for initial services of the testing laboratory as further described hereinafter.

1.02 QUALITY ASSURANCE

- A. The Owner will select an independent testing laboratory to conduct the tests. Selection of the material required to be tested shall be by the laboratory or the Owner's representative and not by the Contractor.
- B. Qualifications of Testing Laboratory: The testing laboratory, approved by DSA, shall be qualified to the Owner's acceptance in accordance with ASTM E329. The testing laboratory shall be qualified by the Division of the State Architect.
- C. Codes and Standards: Testing, when required, will be in accordance with pertinent codes and regulations and with selected standards of the American Society for Testing and Materials and other organizations or agencies which publish recognized codes, standards, or tests. Refer to Article 3.04 - Required Testing of this Section.

1.03 TEST REPORT DISTRIBUTION

- A. Promptly process and distribute required copies of test reports and related instructions to ensure necessary retesting and/or replacement of materials with the least possible delay in progress of the Work.

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- B. One copy of Test Reports shall be forwarded to the Project Inspector by the testing agency. Such reports shall include tests made, regardless of whether such tests indicate that the material is satisfactory or unsatisfactory. Samples taken but not tested shall also be reported. Records of special sampling operations as required shall also be reported. The reports shall show that the material or materials were sampled and tested in accordance with the requirements of Title 24 and with the approved specifications. Test reports shall show the specified design strength. They shall also state whether or not the material or materials tested comply with requirements.
- C. Each Testing Agency shall submit to the Division of the State Architect a verified report in duplicate covering tests which are required to be made by that agency during the progress of the project. Such report shall be furnished each time that work on the project is suspended, including tests up to that time, and at the completion of the project. For additional information, refer to DSA PR13-01.

1.04 PAYMENT FOR TESTING SERVICES

- A. Initial Services: The Owner will pay for initial testing and inspection except as specifically modified herein- after or as specified otherwise in technical sections, provided the results of inspection indicate compliance with the Contract Documents.
- B. Retesting: When initial tests or inspection indicate noncompliance with the Contract Documents, subsequent retesting or re-inspection occasioned by the noncompliance shall be performed by the same testing laboratory or Inspector and the costs thereof will be deducted by the Owner from the Contract Sum. Retesting and re-inspection will continue until test or inspection results indicate compliance.
- C. Code Compliance Testing: Inspections and tests required by codes or ordinances, or by authorities having jurisdiction and made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Owner, but backcharged to the Contractor in case of retesting due to non-compliance.
- D. Specified Inspections and Tests: Tests and inspections specified in the Specifications, directly or by reference, shall be coordinated by the Contractor at his expense and paid for by the Owner. Corrections of noncompliance and test failures shall be paid for by the Owner but shall be backcharged to the Contractor. Re-inspection and retesting shall be in accordance with paragraph 1.04-B.
- E. Contractor's Convenience Testing: Inspecting or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of and at the expense of the Contractor.

1.05 INSPECTION BY THE OWNER

- A. The Owner and his representatives will have access, for the purpose of inspection, to parts of the work and to the shops wherein the work is in preparation, and the Contractor shall maintain proper facilities and provide safe access for such inspection.
- B. The Owner shall have the right to reject materials and workmanship which are defective, and to require their correction. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the premises without charge to the Owner. If the Contractor does not correct such rejected work within a reasonable time, fixed by written notice, the Owner may correct rejected work and charge the expense to the Contractor.

- C. Should it be considered necessary or advisable by the Owner at any time before final acceptance of the entire work to make an examination of work already completed by removing or tearing out the same, the Contractor shall on request promptly furnish necessary facilities, labor and materials. If such work is found to be defective in respect due to fault of the Contractor or his subcontractor, he shall defray expenses of such examinations and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, the additional cost of labor and material necessarily involved in the examination and replacement will be allowed the Contractor.

1.06 OWNER'S INSPECTOR

- A. An Inspector employed by the Owner, approved by DSA in accordance with the requirements of the State of California Administrative Code, Title 24, Part 1, and qualified in accordance with Division of the State Architect will be assigned to the work. Reference DSA IR A-7 and IR A-8 for project Inspector certification and approval and duties and performance rating by DSA. The inspector duties are specifically defined in Title 24, Part 1, Section 4-342, reprinted herein:

" **4-342 Duties of the Project Inspector**

- (a) **General.** The project inspector shall act under the direction of the architect or registered engineer and under the supervision of the enforcement agency.
- (b) **Duties.** The general duties of the project inspector in fulfilling project inspection responsibilities are as follows:
1. **Continuous inspection requirement.** The project inspector must have actual personal knowledge obtained by personal and continuous inspection of the work of construction in all stages of its progress that the requirements of the approved plans and specifications are being completely executed.

Continuous inspection means complete inspection of every part of the work. Work, such as concrete work or masonry work which can be inspected only as it is placed, shall require the constant presence of the inspector. Other types of work which can be completely inspected after the work is installed may be carried on while the inspector is not present. In any case, the inspector must personally inspect every part of the work. In no case shall the inspector have or assume any duties that will prevent the inspector from giving continuous inspection. DSA may require verification from the project inspector of time spent at the construction site during all phases of the work.

The project inspector may obtain personal knowledge of the work of construction, either on-site or off-site, performed under the inspection of special inspectors and/or assistant inspectors (Section 4-333). The project inspector may obtain personal knowledge that materials used in the construction conform to the DSA approved documents by verifying test reports performed by DSA accepted testing facilities, verifying materials certifications shipped with the materials, or other means as specified in the DSA approved

documents and referenced codes and standards. The project inspector shall be responsible for monitoring the work of the special inspectors and testing laboratories to ensure that the testing program is satisfactorily completed. The project inspector shall be responsible for supervising the work of all assistant inspectors in accordance with Section 4-333(d). The exercise of reasonable diligence to obtain the facts shall be required.

2. **Relations with the architect or engineer.** Any uncertainties in the inspector's comprehension of the plans and specifications or inconsistencies or seeming errors in the approved construction documents shall be reported promptly to the architect or registered engineer for interpretation and instructions. In no case shall the instruction of the architect or registered engineer be construed to cause work to be done which is not in conformity with the DSA approved documents.
3. **Job file.** The project inspector shall always keep and maintain a file on the job with all of the following:
 - A. DSA approved plans and specifications including DSA approved addenda and all construction change documents.
 - B. Applicable parts of the edition of Title 24, C.C.R. referred to in the plans and specifications, and any pertinent reference standards.
 - C. DSA approved statement of structural tests and special inspections.
 - D. Copies of the project inspector's semi-monthly reports.
 - E. Copies of all deviation notices and a log of all deviation notices. The log shall reference all applicable details and specification sections related to nonconforming materials and workmanship including field change documents, change orders, addenda and deferred submittals. The log shall describe all corrective actions taken whether performed in accordance with DSA approved documents or not, the current status of each deviation issue and the resolution for each issue.
 - F. Log documenting all significant communications with the design professionals, contractors, DSA representatives and other persons involved in the project. Significant communications include, but are not limited to, interpretations, clarifications or directions from the design professionals, issues identified by DSA representatives, directives from the school district, and start notices from the contractor.
 - G. Laboratory test and inspection reports.
 - H. Contractor's request for information (RFI) and responses to the RFIs.

- I. Interpretations and clarifications from the design professional in general responsible charge.
- J. Special inspection reports.
- K. Concrete placing operation records showing the time and date of placing concrete and the time and date of removal of forms in each portion of the structure.
- L. Welding operation records including identification marks of welders, lists of defective welds, manner of correction of defects, etc.
- M. Pile driving operation records including penetration under the last 10 blows for each pile when piles are driven for foundations.
- N. Verified reports for all persons required by this code for file verified reports.
- O. Any other applicable documents required to provide a complete record of construction.

The job file shall be kept on the job site until the completion of the project and shall be readily accessible to DSA personnel during site visits. A copy of the job file shall be made available to DSA upon request. The job file, with exception of building codes and reference standards, shall be made a part of the permanent school district records.

- 4. **Project inspector's semimonthly reports.** The project inspector shall keep the architect or registered engineer thoroughly informed as to the progress of the work by making semimonthly reports in writing as required in Section 4-337.
- 5. **Notifications to DSA.** The project inspectors shall notify DSA by email at the following times:
 - A. When construction work on the project is started or restarted if previously suspended per Item D below.
 - B. At least 48 hours in advance of the time when foundation trenches will be complete, ready for footing forms.
 - C. At least 48 hours in advance of the first placement of foundation concrete and 24 hours in advance of any subsequent and significant concrete placement.
 - D. When all work on the project is suspended for a period of more than one month.
- 6. **Deviations.** The project inspector shall notify the contractor, in writing, of any deviations from the approved plans and specifications which are not immediately corrected by the contractor when brought to the contractor's attention. Copies of such notice shall be forwarded immediately to the architect or registered engineer, and to DSA.

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Failure on the part of the project inspector to notify the contractor of deviations from the approved plans and specifications shall in no way relieve the contractor of any responsibility to complete the work covered by his or her contract in accordance with the approved plans and specifications and all laws and regulations.

7. **Inspector verified reports.** The project inspector shall make and submit directly to DSA verified reports (see Section 4-336). The project inspector shall prepare and deliver to DSA detailed statements of fact regarding materials, operations, etc., when requested.
 8. **Performance of duties.** The inspector shall perform all duties and render all services with honesty. Inspectors who fail to carry out their duties in an ethical manner or who engage in illegal activities may be subject to disciplinary action as defined in Section 4-342(d).
- (c) **Violations.** Failure, refusal or neglect on the part of the inspector to notify the contractor of any work which does not comply with the requirements of the approved plans and specifications, or failure, refusal or neglect to report immediately, in writing, any such violation to the architect or registered engineer, to the school board, and to DSA shall constitute a violation of the Act and shall be cause for DSA to take action which may result in withdrawal of the inspector's approval. The State Architect or designee may take appropriate action as described in Section 4-342(d) when any of the following conditions exist:
1. The inspector has failed to fulfill any of the relevant requirements of this code.
 2. The inspector has been convicted of a crime considered to be substantially related to the qualifications, functions or duties of an inspector in a manner consistent with the public health, safety or welfare.
- (d) **Disciplinary actions.** Failure to satisfactorily perform inspector duties identified in this code may be cause for DSA to take action(s) which included but are not limited to the following:
1. Requiring the inspector to meet with DSA in the regional office for counseling.
 2. Requiring the inspector to attend training classes.
 3. Withdrawal of the inspector's approval for the project.
 4. Downgrading of the inspector's class of certification.
 5. Suspension of the inspector's certification.
 6. Withdrawal of the inspector's certification.
- (e) **Notice of disciplinary actions.** Notice of disciplinary action shall specify the grounds for the actions taken.
- (f) **Criteria for reinstatement.** When considering reversal of any disciplinary action taken pursuant to Section 4-342(d), the State Architect or designee evaluating the reinstatement of an inspector's approval for a project, or

certification, may consider the following criteria:

1. Nature and severity of the act(s) or offense(s).
2. The time that has elapsed since the commission of the act(s) or offense(s).
3. If applicable, evidence of expungement proceedings pursuant to Section 1203.4 of the Penal Code.

(g) Filing an appeal.

1. The State Architect or his/her designee has the discretion to immediately order that approval of a project inspector for a project, or certification, be temporarily invalidated or to seek additional information, pending a final determination by the State Architect or his/her designee pursuant to Section 4-342©. The decision to temporarily invalidate approval of a project inspector for a project, or certification, will be made on a case by case basis, as necessary to ensure public health, safety and welfare.
2. The State Architect or his/her designee shall provide the appellant with written notice that their approval for a project, or certification, has been temporarily invalidated as of a specific date or is subject to suspension or denial pursuant to Section 4-342(d), pending a final determination. The written notice shall include the reasons for the action being taken or investigated, as applicable, and provide a summary of the facts and allegations. Service of the written notice of the proposed action shall be confirmed by certified mail.
3. Written notice of the final determination by the State Architect or his/her designee shall be confirmed by certified mail within 60 days from the initial written notification. The time to render his/her determination may be extended an additional 30 days, as necessary, to consider any additional supporting documentation provided to the State Architect relevant to the issue being investigated.
4. An appeal of an action by the State Architect or his/her designee to suspend approval of a project inspector for a project, or certification, or to deny renewal of a certification must be filed in wiring with DSA within 60 days of the date posted on the certified service of the written notice of the final determination from the State Architect. Unless a hearing is specifically requested as provided in Section 4-342(g)6 the appeal will be based on an analysis of the materials available.
5. Within 60 days from the date of receipt of the appeal the State Architect or his/her designee shall render his/her determination on the appeal. The time to render the determination may be extended an additional 30 days, as necessary to conclude any research or investigation required, at the discretion of the State Architect or his/her designee.

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6. Should an individual submit a written request for a hearing, the State Architect may designate an appropriate hearing officer to conduct the hearing. Written notice of the date and time of the hearing and the reasons for the action being taken or investigated, as applicable, shall be provided to the appellant. The hearing shall be limited in scope to the actions stated in the written notice. The appellant may bring a representative of his/her choice.
7. The appellant shall be notified in writing of the determination made by State Architect or his/her designee regarding the appeal. Service of the written notice of the decision shall be confirmed by certified mail.
8. Any appeal of a decision rendered by the State Architect or his/her designee to rescind approval for a project or certification may be appealed to the Superior Court.

Authority: Education Code Sections 17310 and 81142.

Reference: Education Code Sections 17309, 17311, 81141 and 81143. "

- B. The work of construction in stages of progress shall be subject to the personal continuous observation of the Inspector as continuous observation is defined by Title 24. He shall have free access to all parts of the work at any time. The Contractor shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and manner of the work and the character of the materials. Inspection of the work shall not relieve the Contractor from obligation to fulfill this Contract.

1.07 OWNER'S OTHER PERSONNEL

- A. From time to time, other personnel in the employ of the Owner may inspect the Work when the Work is in progress but shall have no authority to direct the Contractor or request changes in the Work except as may be provided elsewhere in the Contract Documents.

1.08 REPRESENTATIVE OF THE DIVISION OF THE STATE ARCHITECT

- A. Architect shall have access to the site in accordance with Title 24.
- B. Field Engineers and Inspectors from DSA. Structural Safety Section, Fire & Life Safety Review and Access Compliance shall have access to the site in accordance with Title 24.

PART 2 - PRODUCTS
(Not Applicable)

PART 3 - EXECUTION

3.01 COOPERATION WITH TESTING LABORATORY AND INSPECTORS

- A. Inspectors and representatives of the testing laboratory shall have access to the work. Provide facilities for such access in order that the testing, inspection, and the obtaining of samples may be done properly.
- B. Contractor shall deliver material specimens to the Owner's testing lab, which must by terms of the Contract be tested prior to inclusion in the Project, at least 45 days prior to scheduled delivery to the job site.
- C. Material shipped by the Contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said representative that such testing and inspection will not be required shall not be incorporated in the job.

3.02 TAKING SPECIMENS

- A. Field specimens and samples for testing, unless otherwise provided in these Contract Documents, shall be selected and taken by the Testing Laboratory or Inspector and not the Contractor. Sampling equipment and personnel will be provided by the testing laboratory. Deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory. Soil samples for approval of import fill shall be delivered to the Testing Laboratory by the Contractor, as directed by the Testing Laboratory.

3.03 SCHEDULES FOR TESTING

- A. Establishing Schedule:
 - 1. By advance discussion with the testing laboratory selected by the Owner, determine the time required for the laboratory to perform its tests and to issue each of its findings.
 - 2. Provide required time within the Construction Schedule.
- B. Revising Schedule: When changes of construction schedule are necessary during construction, coordinate such changes of schedule with the testing laboratory as required.
- C. Adherence to Schedule: When the testing laboratory is ready to test according to the determined schedules, but is prevented from testing or taking specimens due to incompleteness of the work, extra charges for testing attributable to the delay may be back-charged to the Contractor and will be deducted by the Owner from the Contract Sum.

3.04 REQUIRED TESTING

All Testing and Inspection requirements shall comply with the Stamped Approved DSA-103, in accordance with California Building Code, Title 24, Part 2.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Construction facilities and temporary controls including:
1. Temporary utilities such as heat, water, electricity, and telephone.
 2. Field offices and storage areas, including offices for Architect and Inspector.
 3. Sanitary facilities for construction personnel.
 4. Enclosures such as tarpaulins, barricades, and canopies.
 5. Provision of fire safety and fire fighting facilities.
- B. Related Work Specified Elsewhere:
1. Installation and connections to existing utility lines are described in the Sections of these Specifications relative to permanent connections required.
 2. Requirements for storage areas shall be as specified in Section 33 44 19 – Utility Storm Water Treatment.

1.02 QUALITY ASSURANCE

- A. Conform with the following criteria of the California Fire Code, Chapter 33 – Fire Safety During Construction, And Demolition:
1. Section 3301.1 SCOPE
 2. Section 3302 DEFINITIONS
 3. Section 3303 TEMPORARY HEATING EQUIPMENT
 4. Section 3304 PRECAUTIONS AGAINST FIRE
 5. Section 3305 FLAMMABLE AND COMBUSTIBLE LIQUIDS
 6. Section 3306 FLAMMABLE GASES
 7. Section 3307 EXPLOSIVE MATERIALS
 8. Section 3308 OWNER'S RESPONSIBILITY FOR FIRE PROTECTION
 9. Section 3309 FIRE REPORTING
 10. Section 3310 ACCESS FOR FIRE FIGHTING
 11. Section 3311 MEANS OF EGRESS
 12. Section 3312 WATER SUPPLY FOR FIRE PROTECTION
 13. Section 3313 STANDPIPES

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- 14. Section 3314 AUTOMATIC SPRINKLER SYSTEM
- 15. Section 3315 PORTABLE FIRE EXTINGUISHERS
- 16. Section 3316 MOTORIZED CONSTRUCTION EQUIPMENT
- 17. Section 3317 SAFEGUARDING ROOFING OPERATIONS

END OF CHAPTER 33

1.03 PROJECT CONDITIONS

- A. Make required connections to existing utility systems with minimum disruption to services.
- B. When disruption of the existing service is required, do not proceed without the Owner's and Architect's review and, when required, provide alternate temporary service.
- C. Environmental Requirements: Provide and maintain heat, fuel, materials, and services necessary to protect work and materials against injury from extreme heat, cold, dry winds, dust, or dampness as follows:
 - 1. During the placing, setting and curing of concrete and cement work, provide enough heat to ensure the heating of spaces involved do not fall to less than 50 degrees Fahrenheit.
 - 2. Suspend operations on work when subject to damage by climatic conditions, flooding, or because of insufficient curing or drying of surfaces or materials.
 - 3. Take necessary action to protect site and Work from wind, flood, and storm damage.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Construction facilities shall be subject to the Architect's review and approval.

2.02 UTILITIES

- A. Water:
 - 1. Provide necessary temporary water lines and water supply and, upon completion of the work, remove temporary facilities.
 - 2. Furnish water needed for construction. Comply with the regulations of local water authority including transport of reclaimed water for construction.
- B. Electricity:
 - 1. Provide necessary temporary wiring and, upon completion of the work, remove temporary facilities.
 - 2. Provide area distribution boxes so located that the individual trades may use 100 feet maximum length extension cords to obtain adequate power and artificial

lighting at points where required for the work, for inspection and for safety.

3. Furnish electricity needed for construction.
- C. Heating: Provide and maintain heat needed for proper conduct of operations included in the work.
- D. Telephone: Make necessary arrangements and pay costs for operation and installation of separate telephone service at locations approved by the District's Inspector.
- E. Utilities for Testing: Normal quantities required to make final tests of installed permanent systems shall be furnished at no cost to the Owner.
- F. Temporary facilities in the public right-of-way are subject to approval. Obtain and pay for any permits required.

2.03 SIGNAGE

- A. Bid Package No. 1, shall provide a 4' x 8' self-supporting temporary sign per the Drawing at the end of this Section. Supporting posts to be wood 4 x 4's embedded minimum four feet into tamped (compacted) soil to discourage easy removal. Verify text with Architect and Owner prior to fabrication. Sign shall remain the property of the School District at the completion of the Work. Remove sign and deliver to the District to location directed by the Owner when the temporary office facilities are removed.
- B. Location of signs shall be as directed by the Architect.

PART 3 - EXECUTION

3.01 MAINTENANCE AND REMOVAL

- A. Maintain facilities and temporary controls as long as needed for the safe and proper completion of the work.
- B. Remove such construction facilities and temporary controls as rapidly as progress of the work will permit, or as directed by the Architect.

END OF SECTION

SECTION 01 56 39

TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Site clearing as specified herein.
- B. Related Sections:
 - 1. Section 33 44 19, Utility Storm Water Treatment
 - 2. Section 01 50 00, Temporary Facilities and Controls
 - 3. Section 31 20 00, Earth Moving
 - 4. Section 32 84 00, Planting Irrigation
 - 5. Section 32 92 00 Turf and Grasses
- C. Principal items of Work included herein:
 - 1. Protection of trees to keep the foliage canopy and branching structure clear from contact by equipment, materials and activities.
 - 2. To preserve roots and soil conditions in an intact and non-compacted state.
 - 3. To identify the Tree Protection Zone (TPZ) in which no soil disturbance is permitted and activities are restricted.

1.01 REFERENCES

- A. Demolition shall be as per 2019 California Fire Code, Title 24, Part 9.

1.02 PROJECT SITE CONDITIONS

- A. The Contractor shall be responsible to furnish and maintain all temporary barricades, warning lights, and other types of protection protect the trees noted on the plans to remain.
- B. The Contractor shall be responsible to protect adjacent properties, roads, right of ways, utilities and other improvements above or below ground from damage in performing the work.
- C. Comply with applicable sections of the storm water pollution prevention plan, including but not limited to, erosion control, soil, waste and maintenance areas.
- D. Salvaged Materials – Contractor shall recycle or compost all tree trimmings. Contractor shall provide certification for all salvaged materials. Certifications may take the form of receipts from recycling facilities, manufacturers, or any other legitimate form of certification.

PART 2 - PRODUCTS
(Not Applicable)

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PART 3 - EXECUTION**

3.01 EXECUTION

- A. Establish the Tree Protection Zone (TPZ), which is defined as a radius of 10 times greater than the diameter of the tree's trunk or ten feet, whichever is greater by enclosed temporary fencing. Fence shall be a minimum of 6' high.
- B. Provide tree protection as follows:
 - 1. Trees in an open area – enclose the entire area under the canopy or TPZ, which ever is greater throughout the life of the construction project.
 - 2. Trees in a planting strip - only the planting strip and yard side of the TPZ shall be enclosed with the required chain like protective fencing.
 - 3. Trees in a tree well or sidewalk planter pit – wrap trees with 2-inches of orange plastic fence from the ground to the first branch and overlay with 2X thick wooden slats bound securely (ensure slats do not dig into bark). Avoid damage to any branches.
- C. Provide a plastic 10-inch by 12-inch sign securely affixed to the fence at a minimum of 20-foot intervals clearly stating "Warning – Tree Protection Zone".
- D. Duration – Tree fencing and signage shall be erected before demolition, grading or construction begins and remain in place until final inspection of the project except for work specifically allowed in the TPZ. Work or disturbance in the TPZ required approval by the Project Manager and Landscape Architect.
- E. No Storage of materials, top soil, vehicles or equipment shall be permitted within the TPZ.
- F. The ground under the tree canopy shall not be altered, unless specifically noted on the plans.
- G. Trees to be retained shall be irrigated, aerated and maintained as necessary to ensure survival.

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: General requirements for delivery, storage, and handling of materials and equipment applicable to the product sections of this specification and necessary for the construction of the Project.
- B. Related Sections:
 - 1. Section 01 25 00 – Substitution Procedures
 - 2. Section 01 33 00 – Submittal Procedures

1.02 GENERAL

- A. Material and Equipment Incorporated into the Work:
 - 1. Conform to applicable specification and standards.
 - 2. Comply with size, make, type, and quality specified.
- B. Manufactured and Fabricated Products:
 - 1. Design, fabricate and assemble in accordance with the best engineering and shop practices.
 - 2. Manufacture like parts of duplicate units to standard sizes and gages for interchangeability.
 - 3. Two or more items of the same kind shall be identical, by the same manufacturer.
- C. Reused Materials: Where the contract documents indicate that existing materials may be reused, such materials shall be cleaned and reincorporated in the work.
 - 1. Materials to be reused shall be approved for reuse by the Inspector.
- D. Supplementary materials not specifically described in each Section, but required for a complete and proper installation of the Work, shall be new, first quality of their respective kinds, and subject to review and acceptance by the District.

1.03 DELIVERY

- A. Arrange deliveries of products in accordance with construction schedules and in ample time to facilitate inspection prior to installation. Notify the Inspector of Record, in writing, when items are delivered to the site, so he may inspect and verify quality and quantities delivered are as intended.
- B. Coordinate deliveries to avoid conflict with work and conditions at site, taking into consideration:
 - 1. Work of the Contractors, or Owner.

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2. Limitations of storage space.
 3. Availability of equipment and personnel for handling products.
 4. Owner's use of premises.
- C. Deliver products in undamaged condition in original containers or packaging, and with identifying labels intact and legible.
- D. Partial deliveries of component parts of equipment shall be clearly marked to identify the equipment, to permit easy accumulation of parts, and to facilitate assembly.
- E. Immediately on delivery, inspect shipment to ensure:
1. Product complies with requirements of Contract Documents and reviewed submittals.
 2. Quantities are correct.
 3. Containers and packages are intact, and labels are legible.
 4. Products are undamaged and properly protected.
- F. The District reserves the right to observe delivered materials, to review the accompanying bills of lading, and to reject the following:
1. Materials not identifiable as accepted products of the accepted manufacturer.
 2. Materials exhibiting shelf-lives in excess of those stipulated by the manufacturer.
 3. Materials not bearing the appropriate label of Underwriters Laboratories (UL), where applicable.
 4. Materials in opened or excessively damaged containers.
 5. Materials exhibiting evidence of moisture, organic matter, or other adulterants.
- G. In the event of damage or rejection by the District for stipulated cause, immediately make repairs and replacements necessary to the acceptance of the Architect and at no additional cost to the Owner.

1.04 STORAGE

- A. Payment will not be made by the Owner for materials stored off-site, until such time as the materials are incorporated into the Work.
- B. Store products immediately on delivery, store in accordance with manufacturer's instructions and as further required by the Owner's Storm Water Pollution Prevention Plan and protect until installed in the Work.
- C. Store products subject to damage by elements in weather tight enclosures.
1. Maintain temperatures within limits recommended by manufacturer's instructions.
 2. Provide humidity control for sensitive products, as required by manufacturer.
 3. Store unpacked products in a manner accessible for inspection.

- D. Exterior Storage:
1. Provide substantial platforms, blocking, or skids to support fabricated products above ground and prevent soiling or staining.
 - a. Cover products subject to discoloration or deterioration from exposure to the elements, with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
 - b. Comply with requirements of Owner's, Storm Water Pollution Prevention Plan.
 2. Store loose granular materials on solid paved surfaces or provide plywood platforms to prevent mixing with foreign matter.
 - a. Provide surface drainage to prevent flow or ponding of rainwater.
 - b. Prevent mixing of refuse or chemically injurious materials or liquids.
 - c. Comply with requirements of Owner's Storm Water Prevention Plan.

1.05 MAINTENANCE OF STORAGE

- A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:
1. State of storage facilities is adequate to provide required conditions.
 2. Required environmental conditions are maintained on a continuing basis.
 3. Surfaces of products exposed to elements are not adversely affected.
- B. Mechanical and electrical equipment which requires servicing during long term storage shall have complete manufacturer's instructions for servicing accompanying each item, with notice of enclosed instructions shown on exterior of package.

1.06 PROTECTION AFTER INSTALLATION

- A. Provide protection of installed products to prevent damage from subsequent operations. Remove protection materials when no longer needed, prior to completion of work.
- B. Control traffic to prevent damage to equipment and surfaces.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

(Not Applicable)

END OF SECTION

SECTION 01 71 23

FIELD ENGINEERING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: General requirements for field engineering necessary to provide horizontal and vertical control, including:
 - 1. Survey work required in execution of the project.
 - 2. Land Surveying services specified or required to execute contractors construction methods.
 - 3. Coordination with testing laboratory or agency and Soils Engineer.
 - 4. Contractor furnished assistance.
 - 5. Verification of conditions.
 - 6. Reporting procedures.
- B. Requirements not in this section:
 - 1. Specific test procedures performed in accordance with Section 01 45 23 - Testing and Inspecting Services.

1.02 QUALIFICATIONS OF ENGINEER OR SURVEYOR

- A. Qualifications: Registered Surveyor qualified to perform land surveying or licensed Land Surveyor acceptable to Architect and Owner. Contractor shall furnish to the Owner prior to start of work the name and license or registration number issued by the State of California, Board of Registration for Professional Engineers and Land Surveyors. Contractor shall provide notice to the Owner during the course of construction should the identification of the individual responsible for this work change from time to time and shall obtain approval of the Architect and Owner for the replacement.
- B. All field engineering services furnished during the course of this project shall be under the direct supervision and control of the named individual Land Surveyor. Contractor shall not provide any surveying services, or similar work, unless specifically staked and set by a licensed surveyor.

1.03 FIELD ENGINEERING REQUIREMENTS

- A. Survey Reference Points:
 - 1. Existing basic horizontal and vertical control points for the project are those designated on the drawings. If there are not 3 specific benchmarks (BM) or temporary benchmarks (TBM) shown, contractor shall identify a minimum of 3 possible TBM's and verify horizontal and vertical location of all three hubs. All work on the plans shall be tied together and verified prior to beginning any field work.

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2. Locate and protect control points prior to starting site work and preserve permanent reference points during construction. Identify and protect survey monuments on the site discovered during construction, which are not referenced on the project drawings. Tie out such monuments and notify Architect prior to allowing them to be disturbed.
3. Replace any permanent boundary markers disturbed during construction with new permanent monuments and file the required Record of Survey or Corner Record in accordance with applicable State and County laws, at no additional cost to the Owner.

1.04 PROJECT SURVEY REQUIREMENTS

- A. Establish a minimum of three permanent horizontal and vertical control points on the site, remote from the "Building Pad Area" or other work area and referenced to data established by the survey control points. Three points shall be tied together, and the survey shall be closed to second order surveying standards.
 1. Site Improvements:
 - a. Provide stakes for grading, fill and topsoil placement.
 - b. Locate utility lines, including, but not limited to, storm drains, sewers, water mains, gas, electric and telephone lines. Provide adequate horizontal control to locate the lines and provide vertical control in proportion to the slope of the line as required for accurate construction.
 2. Provide curb stakes and elevations as required to construct paving and on and off-site concrete work.
 - a. Calculate and layout subgrade elevations and intermediate controls as required to provide smooth transitions between the spot elevations indicated on the plans.
 - b. Prior to placement of any permanent improvements, surveyor shall verify layouts of work by the same methods. Surveyor shall certify that the work is true to line and grade as shown on the approved site and grading plans.
 3. Provide a building pad certification prior to beginning any work on the building pad. Building Pad Certification shall be signed by the licensed surveyor and attest to the pad elevation tolerance of no more that 0.04 feet of the elevations shown on the approved grading plans.

1.05 RECORDS

- A. Maintain a complete, accurate log of control and survey work as it progresses.
- B. Provide a complete digital survey file in CAD format of all new work as it was placed in the field.

1.06 SUBMITTALS

- A. Submit name and address of Licensed Surveyor to Architect, including changes as they may occur from time to time.

- B. On request of the Architect, submit documentation to verify accuracy of the field engineering work.
- C. Project Record (As-Built) Drawings:
 - 1. At the project completion, deliver to Architect, final "as-built" Record Drawings of the Work, in CAD and PDF Format. Clearly indicate differences between original drawings and completed work within specified tolerances.
 - 2. Show as-built locations by coordinates of utilities on-site with top of pipe elevations at major grade and alignment changes.
 - 3. Completed as-built PDFs shall be signed and certified as correct by the licensed Surveyor.
 - 4. Furnish any required Engineering Survey information for all utility easements for any required document recording.
 - 5. Submit certification of subgrade completion and building location on the building pads showing the actual elevation of the completed constructed subgrade, to the nearest hundredth of a foot 0.01 foot.

PART 2 - PRODUCTS
(Not Applicable)

PART 3 - EXECUTION
(Not Applicable)

END OF SECTION

SECTION 01 73 29

CUTTING AND PATCHING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Administrative and procedural requirements for cutting and patching.
- B. Related Work Specified Elsewhere:
 - 1. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the work.
 - 2. Requirements of this Section apply to mechanical and electrical installations. Refer to Division 21 through Division 28, Sections for other requirements and limitations applicable to cutting and patching plumbing, mechanical and electrical installations.

1.02 SUBMITTALS

- A. Before commencing alteration or demolition work, submit for review by the Architect and approval of the Owner, a Schedule showing the commencement, the order and the completion dates for the various parts of this work. Where approval of procedures for cutting and patching is required before proceeding, submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:
 - 1. Describe the extent of cutting and patching required and how it is to be performed; indicate why it cannot be avoided.
 - 2. Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
 - 3. List products to be used and firms or entities that will perform Work.
 - 4. Indicate dates when cutting and patching is to be performed.
- B. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted. Before starting work relating to existing utilities (electrical, sewer, water, heat, gas, fire lines, etc.) that will temporarily discontinue or disrupt service to the existing building, notify the Architect and the Owner 72 hours in advance and obtain the Owner's approval in writing before proceeding with this phase of the work.
- C. Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations to show how reinforcement is integrated with the original structure. All cutting of structural elements subject to acceptance of the Structural Engineer and approval of the Division of the State Architect prior to execution.

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- D. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory. Subject to approval by the Division of the State Architect.
- E. All cutting and patching of existing hard scape or landscaping for installation or modification, shall be reinstalled in kind. When new utilities are shown or utility modifications are shown on the plans and specific cutting and patching notes are not shown, the contractor shall assume that the existing hardscape shall be saw cut, material removed and disposed, trenches prepared in accordance with local water district or county regulations, and all existing hardscape shall be returned to existing condition or better.

1.03 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut or notch any structural elements unless specifically detailed on the Drawings.
- B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.
- D. If possible, retain the original installer or fabricator to cut and patch the following categories of exposed Work, or if it is not possible to engage the original installer or fabricator, engage another recognized experienced and specialized firm:

- Processed concrete finishes
- Stonework and stone masonry
- Ornamental metal
- Matched-veneer woodwork
- Preformed metal panels
- Window wall system
- Stucco and ornamental plaster
- Acoustical ceilings
- Terrazzo
- Finished wood flooring
- Carpeting
- Aggregate wall coating
- Wall covering
- Swimming pool finishes
- HVAC enclosures, cabinets or covers

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Use materials that are identical to existing materials. Materials and workmanship employed in the alterations, unless otherwise shown or specified, shall conform to that of the original work, or to new construction as specified elsewhere in these specifications. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.
- B. It is intended that interior finish materials, or existing surfaces to be removed, be re-used insofar as reasonable in areas necessary to match existing surfaces. Care in removal and stockpiling shall be exercised to ensure re-use.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.
- B. Before proceeding, meet at the site with entities involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.02 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Make such explorations and probes as are necessary to ascertain required protective measures before proceeding with demolition and removal. Give particular attention to shoring and bracing requirements so as to prevent damage to existing construction.
- C. Provide, erect, and maintain catch platforms, lights barriers, weather protection, warning signs and other items as required for proper protection of the public, occupants of the building, workmen engaged in demolition operations, and adjacent construction.
- D. Provide and maintain weather protection at exterior openings so as to fully protect the interior premises against damage from the elements until such openings are closed by new construction.
- E. Provide and maintain temporary protection of the existing structure designated to remain where demolition, removal and new work is being done, connections made, materials handled, or equipment moved.
- F. Take necessary precautions to prevent dust and dirt from rising by wetting demolished masonry, concrete, plaster and similar debris. Protect unaltered portions of the existing building affected by the operations under this Section by dustproof partitions and other adequate means.

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- G. Provide adequate fire protection in accordance with local Fire Departments, and with Section 01 50 00.
- H. Do not close or obstruct walkways, passageways or stairways. Do not store or place materials in passageways, stairs, or other means of egress. Conduct operations with minimum traffic interference.
- I. Be responsible for damage to the existing structure or contents by reason of the insufficiency of protection provided.
- J. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
 - 1. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
 - 2. Take precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.03 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.
 - 1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill. Provide pilot holes at corners and do not overcut.
 - 4. Comply with requirements of applicable Sections of Division 2 where cutting and patching requires excavating and backfilling.
 - 5. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with

specific tolerances.

1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 3. Where removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken containing the patch, after the patched area has received primer and second coat.
 4. Patch, repair or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.
- D. Perform demolition, removal and alteration work with due care, including shoring, bracing, etc. Be responsible for damage which may be caused by such work to part or parts of existing structures or items designated for re-use. Perform patching, restoration and new work in accordance with applicable technical sections of the Specifications.
- E. Materials and/or items designated to become the property of the Owner shall be as shown. Remove such items with care, under the supervision of the trade responsible for reinstallation; protect and store until required. Replace material and/or item damaged in its removal with approved similar and equal new material.
- F. Materials and/or items demolished and not designated to become the property of the Owner or to be reinstalled shall become the property of the Contractor and shall be removed from the Owner's property. Storage or sale of removed items on site will not be permitted.
- G. Execute the work in a careful and orderly manner, with the least possible disturbance to the public and to the occupants of the building.
- H. Where alterations occur, or new and old work join, cut, remove, patch, repair or refinish the adjacent surfaces or so much thereof as is required by the involved conditions, and leave in as a good a condition as existed prior to the commencing of the work. The alteration work shall be performed by the various respective trades which normally perform the particular items of work.
- I. Finish new and adjacent existing surfaces as specified for new work. Clean existing surfaces of dirt, grease, loose paint, etc. before refinishing.
- J. Where existing equipment and fixtures are indicated to be re-used, repair such equipment and fixtures and refinish to put in perfect working order. Refinish as directed.

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- K. Cut out embedded anchorage and attachment items as required to properly provide for patching and repair of the respective finishes.

- L. Confine cutting of existing roof areas designated to remain to the limits required for the proper installation of the new work. Cut and fold back existing built-up roofing. Cut and remove insulation, etc. Provide temporary weathertight protection as required until new roofing and flashings are applied.

3.04 CLEANING

- A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION

SECTION 01 74 00

CLEANING AND WASTE MANAGEMENT

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Cleaning throughout the construction period, and final project cleaning after acceptance tour "**Punch List**" has been completed.
- B. Related Work Described Elsewhere: In addition to standards specified herein, comply with requirements for cleaning as described in other sections of these Specifications.

1.02 QUALITY ASSURANCE

- A. Inspection: Conduct daily inspection, and more often if necessary, to verify that requirements of cleanliness are being met.
- B. Codes and Standards: In addition to the requirements specified herein, comply with pertinent requirements of authorities having jurisdiction.

PART 2 - PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

- A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.02 COMPATIBILITY

- A. Use cleaning materials and equipment which are compatible with the surfaces being cleaned, as recommended by the manufacturer of the material to be cleaned.
- B. Do not power wash concrete/masonry surfaces.

PART 3 - EXECUTION

3.01 PROGRESS CLEANING

- A. General:
 - 1. Retain stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of materials.
 - 2. Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this work. Debris shall be removed from the site and disposed of in a lawful manner. Disposal receipts or dump tickets shall be furnished to Architect upon request.
 - 3. At least twice each month, and more often if necessary, remove scrap, debris, and waste material from the job site.
 - 4. Provide adequate storage for items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.
- B. Site:

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1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove items to the place designated for their storage. Combustible waste shall be removed from the site. Flammable waste shall be kept in sealed metal containers until removed from the site.
2. Weekly, and more often if necessary, inspect, arrangements of materials stored on the site; restack, tidy, or otherwise service arrangements to meet the requirements specified above.
3. Maintain the site in a neat and orderly condition.

C. Structures:

1. Weekly, and more often if necessary, inspect the structures and pick up scrap, debris, and waste material. Remove items to the place designated for their storage.
2. Weekly, and more often if necessary, sweep interior spaces clean.
 - a. "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 handheld broom, i.e., "broom-clean".
3. As required preparatory to installation of succeeding materials, clean the structures of pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the required cleanliness.
4. Following the installation of finish floor materials, clean the finish floor daily and more often if necessary, and while work is being performed in the space in which finish materials have been installed.
 - a. "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, i.e., "vacuum clean".

3.02 FINAL CLEANING

- A. Definition: Except as otherwise specifically provided, "clean", for the purpose of the Article, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials, i.e., "scrub and polish clean".
- B. General: Prior to completion of the work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste, conduct final progress cleaning as described above.
- C. Site: Unless otherwise specifically directed by the Architect, water and broom clean paved areas on the site and public paved areas directly adjacent to the site. Remove resultant debris.

D. Structures:

1. Exterior: In areas affected by the work under this contract, visually inspect exterior surfaces and remove traces of soil, waste material, smudges, and other foreign matter. Remove traces of splashed material from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure.

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.

2. Interior: In areas affected by the work under this contract, visually inspect interior surfaces and remove traces of soil waste material, smudges, and other foreign matter. Remove traces of splashed materials from adjacent surfaces. Remove paint drippings, spots, stains, and dirt from finished surfaces. Use only the cleaning materials and equipment instructed by the manufacturer of the surface material.
3. Glass: Clean glass inside and outside.
4. Polished surfaces: On surfaces requiring the routine application of buffed polish, apply the polish recommended by the manufacturer of the material being polished. Glossy surfaces shall be cleaned and shined as intended by the manufacturer.

- E. Timing: Schedule final cleaning after the **Final Punch List** has been completed by the Architect to enable the Owner to accept a completely clean project.

3.03 CLEANING DURING OWNER'S OCCUPANCY

- A. Should the Owner occupy the work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning of the occupied spaces shall be determined by the Architect in accordance with the General Conditions of the Contract.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Operations and submittals required to establish Substantial Completions, Project Acceptance, and filing of Notice of Completion.
- B. Contract Completion Date is the day established by the Agreement, the Special Conditions, and the Notice to Proceed as the calendar date by which all Work must be completed in accordance with the Contract Documents. Once established, the Contract Completion Date can only be altered by Change Order. If Work is not complete in accordance with the Contract Documents by the Contract Completion Date, Contractor is obligated to pay liquidated damages to the Owner. In accordance with the terms of the Contract.
- C. Substantial Completion: The Date of Substantial Completion is the date on which the Architect certifies to the Owner that construction is sufficiently complete, in accordance with the Contract Documents, that the District may occupy the Project for the use intended, and all agencies and authorities have provided written acceptance of the portions of the Work over which they have jurisdiction.
- D. Project Acceptance: The District will accept completion of the Contract after the entire Work shall have been completed to the satisfaction of the District and after issuance of the Certificate of Substantial Completion. The Work may only be accepted as complete by formal action of the Governing Board of the School District. Acceptance of the Project by the Governing Board establishes the formal and official Completion Date for the Project, to be compared against the Contract Completion Date. Project Acceptance must occur prior to Contract Completion Date to preclude assessment of liquidated damages.
- E. Notice of Completion: The date of record for the Notice of Completion shall be the date stamped on the Notice by the County Recorder at the time the County Recorder registers the Notice (note: this is normally not the same date as the date the Owner actually files the Notice of Completion with the Recorder office).

1.02 CLOSEOUT SCHEDULE AND PROCEDURE

- A. Requirements Preparatory to Project Acceptance:
 - 1. Contractor shall deliver certifications to Architect that no new materials containing asbestos have been included in the work.
 - 2. Temporary facilities shall be removed from site as specified in Section 01 50 00, Temporary Facilities and Controls.
 - 3. Entire site shall be thoroughly cleaned of all construction debris.
 - 4. Record drawings shall be completed, signed by Contractor and Inspector and submitted to Architect as specified in Section 01 78 39 – Project Record Documents.
 - 5. Guarantees and warranties shall be submitted to Architect as specified in General conditions and Section 01 78 30 – Warranties.

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6. Contractor's Final Verified Report (Form DSA-6) and other Reports and Affidavits required by the Division of State Architect shall be submitted.
 7. Operating and maintenance data shall be submitted and instruction sessions completed as outlined in Section 01 78 23 – Operating and Maintenance Data and as required in CBC 2019 Section 110.3.10.2.
 8. Contractor to provide a copy of cleaning and maintenance recommendations for countertops to the underneath side of furniture, in addition to requirements listed above and outlined in Section 01 78 23 – Operating and Maintenance Data.
- B. Project Acceptance Requirements, Division of the State Architect:
1. Upon completion of construction of the project, the following reports are required to be submitted before the Division of the State Architect will issue a letter to certificate of compliance of the work:
 - a. A copy of the Notice of Completion filed by the School District.
 - b. Final Verified Report Form DSA 6 AE and DSA 6 C certifying all work is 100% complete from the Architect, Structural Engineer, Mechanical Engineer and the Electrical Engineer. Final retention payment shall not be released until DSA 6 C is uploaded into the DSA project file.
 - c. Contractor's Documents and Field Reports:
 - 1) Final Verified Report Form DSA 6 C, certifying all work is 100% complete, from the Contractors (or Contractors), the Inspector of Record, and Special Inspector(s).
 - 2) Verified Reports of Testing and Inspection as specified on the approved drawings and specifications (i.e., Final Laboratory Report, Welding, Glued-laminated Timber, etc.).
 - 3) Weighmaster's Certificate (if required by approved drawings and specifications).
 - 4) If responsibility was changed in any area during construction, the change must be supported by appropriate documentation and termination reports filed by the individuals originally charged with responsibility.
- C. Procedure for Project Acceptance:
1. Contractor shall complete all Work as required by the Contract Documents, to the best standards of the industry and the trades involved. It shall be the Contractor's responsibility to provide a new, complete, properly operating, professionally finished, detailed, cleaned, high-quality project. There shall be no loose, untrue, or ill-fitting materials, unsightly gaps, voids, or holes, misalignments, mis-adjustments, shoddy workmanship, or damaged, missing, inoperable, or incomplete work. Work shall be free of smudges, spots, stains, dirt, nicks, tears, cracks, scratches, paint runs, flaws, over sprays, and all other unsightly blemishes.

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2. Completion lists and correction lists for items described in the paragraph above, as opposed to short lists of a few minor corrective items that may have inadvertently been missed by the Contractor, shall be the responsibility of the Contractor, and not the Architect, Inspector, or District. By entering into this Contract, Contractor agrees that quality control is the responsibility of the Contractor. "Punch" list generated by the Architect is under no circumstances to be considered a vehicle to compel subcontractors to complete contract work.
3. Contractor shall prepare a comprehensive and complete list of corrective items for himself and his subcontractors and shall verify that these items have been corrected prior to notifying the Architect of completion. Copies of the Contractor's list(s) shall be made available to the Architect and Inspector upon request.
4. Contractor shall notify the Architect *in writing* when Contractor, with concurrence of Inspector, feels the project is one-hundred percent complete and is ready to leave the Project. Architect shall then commence the construction review and prepare a "Punch List", or list of minor corrective items to be issued to Contractor. For convenience, reviews may be phased for various portions of the work, as each distinct portion becomes one hundred percent (100%) complete.
5. Architect will arrange for Engineering Consultants to make their construction reviews, to be completed before Architect will make his construction review. Contractor and his principal superintendent, authorized to act in behalf of the Contractor, as well as principal subcontractors that the Architect may request to be present, shall accompany the Architect/Engineers during the construction reviews.
6. Excessive amounts of corrective ("punch list") items, as judged by the Architect, shall be grounds to terminate the construction review until such time as the Contractor is deemed sufficiently complete to once again start the review. As a rule of thumb, more than four minor items per typical room will be considered excessive.
7. If Owner elects to occupy the Project after the Contract Completion Date, but before the Contractor has completed the Work, Architect must make a comprehensive construction review prior to Owner's occupancy. Contractor shall reimburse Architect and Engineers for their time in conducting such review, and for the time of their clerical staffs in preparing the review documents, at the Architect's/Engineer's standard hourly rates for extra services. Contractor will be billed at the time of Contractor's Application for Payment. Payments to the Architect not received within 30 days will be deducted from subsequent Contractor's Applications for Payment in accordance with the General Conditions.
8. After completion of "Punch List" work, Contractor shall notify Architect in writing to perform an acceptance tour. Notice shall be issued at least seven (7) days in advance of the time the acceptance tour is to be performed.
9. Contractor and his principal superintendent, authorized to act in behalf of Contractor, as well as principal subcontractors that Architect may request to be present, shall accompany Architect and Inspector on acceptance tour.
 - a. If work has been completed in accordance with Contract Documents, and no further corrective measures are required, Architect will issue a Certificate of Substantial Completion, and recommend that Owner accept Project and file Notice of Completion.

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- b. If work is judged to be substantially completed in accordance with Contract Documents, and only a few corrective measures are required, Architect will issue a Certificate of Substantial Completion, (Article 64 of the General Conditions), and recommend that Owner conditionally accept Project and file Notice of Completion. Owner may conditionally accept project and withhold amount for completion per Article 64 of the General Conditions, Contractor shall issue a written notice of intent to complete the corrective measures by a specific named date agreed to by District.
 - c. If work has not been substantially completed in accordance with Contract Documents, and several or many corrective measures are still required, Architect will recommend that Owner not accept project and not file Notice of Completion. Instead, based on information gathered from acceptance tour, Contractor will be required to complete corrective measures and then call for another project acceptance tour following procedure outlined above. Contractor will compensate Architect and Inspector for additional acceptance tour and deduct amount paid from final payment to Contractor.
10. After Substantial Completion, Contractor shall issue an Application for Payment in accordance with Specification Section 01 29 00, Part 1.03, H. All administrative actions and submittals, including conditions, outlined therein outlined must be complete prior to Owner's release of payment, **and MUST BE COMPLETED PRIOR TO AGENDIZING FOR PROJECT ACCEPTANCE BY THE OWNER'S GOVERNING BOARD.**
11. Upon Contractor completing all administrative actions and submittals, and meeting all conditions, Owner will agendize acceptance of the Work for the next official meeting of the Governing Board. Official action by the Governing Board shall constitute Project Acceptance. Upon acceptance, Contractor shall immediately remove trailers and other remaining temporary facilities.
12. District shall file Notice of Completion with the County Recorder as soon as practicable following Project Acceptance. The date of record for the Notice of Completion shall be the date stamped on the Notice by the Recorder at the time the County Recorder registers the Notice.
13. **The date stamped on the Notice of Completion by the County Recorder shall be the date for commencement of all warranties and guarantees, and the date the Owner becomes responsible for security, maintenance, heating and cooling, utilities, damage to the work (unless done by Contractor's forces working on corrective items), and insurance.**
Contractor shall remain responsible for these items prior to this date.
The Owner will inform the Contractor by letter immediately after receiving confirmation in writing from the Recorder's office of registration of the Notice of Completion. Contractor is hereby notified that the process of registering, stamping, and receipt of confirmation from the County has been known to take as much as four weeks from the time of filing.
14. Upon acceptance of Project by Owner, Contractor shall submit his request for final payment in accordance with Specification Section 01 29 00 – Payment

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Procedures, Part 1.03, I. Payment of retention will not be made by Owner until 35 days after Notice of Completion has been registered by the County Recorder.

In addition, retention payment will not be made until Contractor has filed the required Form DSA 6 with Division of the State Architect, with copy to the Architect.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

(Not Applicable)

END OF SECTION

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 SUMMARY:

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplemental Conditions and Division 1 Specifications Sections, apply to this section, and including all Technical Specifications Sections, and the Operating and Maintenance Requirements of Division 21 through Division 28.
- B. Section Includes:
 - 1. Compilation of product data and related information appropriate for Owner's maintenance and operation of products and equipment furnished under the Contract per 2019 CBC Section 110.3.10.2.
 - 2. Instruction of Owner's personnel in the maintenance of products and in the operation of equipment and systems.

1.02 SUBMITTAL PROCEDURES

- A. Preliminary: Submit one copy of proposed manuals to Architect at least 15 days prior to final inspection or acceptance.
- B. Final: Following the indoctrination and instruction of the Owner's operating and maintenance personnel, review proposed revisions to the manual with the Architect.
 - 1. Submit three copies of accepted data in final form 10 days after final inspection. Approval of submittal is a pre-requisite at Substantial Completion prior to Owner's agendaizing project for acceptance by the Governing Board.

PART 2 - PRODUCTS

2.01 FORMAT

- A. Size: Minimum 4 inch, three-ring binders for 8-1/2" x 11" punched pages, completely clear plastic covered for insertion of labels on spines and covers.
- B. Provide identifying tabbed pages. Classify by Division and by Section. All tabbing shall be in numerical order.
- C. Drawings:
 - 1. Provide reinforced punched binder tab. Bind drawings with text.
 - 2. Fan fold larger drawings to size of text pages, for easy foldout.
- D. Cover: Identify each volume with typed or printed label, List:
 - 1. Title of Project
 - 2. Identity of separate structures as applicable.
 - 3. Identity of general subject matter covered in the manual.

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E. Spine: Identify each volume with typed or printed label stating OPERATING AND MAINTENANCE INSTRUCTIONS, GUARANTEES AND SERVICE CONTRACTS and the following information:

1. Title of Project.
2. Divisions and Sections included within volume.
3. Volume number (i.e. "1 of 4")

PART 3 - EXECUTION

3.01 CONTENT OF MANUAL

A. Table of Contents:

1. List of each product indexed to the content of the volume.
2. List with each product the name, address, and the telephone number of:
 - a. Subcontractor and installer.
 - b. Maintenance contractor, as appropriate.
 - c. Local sources of supply for parts and replacement.

B. Product Data: Annotate each sheet to clearly identify the data applicable to the installation. Delete references to inapplicable information.

C. Drawings:

1. Supplement product data with Drawings as necessary to illustrate the following:
 - a. Relationship of component parts of equipment and systems.
 - b. Control and flow diagrams.
2. Do not include Project Record Drawings as maintenance drawings.

D. Instructions: Provide written text, as required to supplement product data for the particular installation.

E. Warranties, Guaranties, Bonds, and Service Contracts: Include a copy of each warranty, guaranty, bond, and service contract issued.

1. Provide information sheet for Owner's personnel describing the following:
 - a. Proper procedures in the event of failure or emergencies.
 - b. Circumstances under which the validity of warranties, guaranties, or bonds might be compromised.

3.02 MANUAL FOR MATERIALS AND FINISHES

A. Instructions for Care and Maintenance: Include Manufacturer's data as follows:

1. Recommendations for types of cleaning agents and methods.
2. Cautions against cleaning agents and methods which are detrimental to the product:
3. Recommended schedule for cleaning and maintenance.

- B. Energy Conservation Features:
 - 1. Provide a list of energy conservation features, materials, components, and mechanical devices installed in the building.

3.03 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Content, for each unit of mechanical equipment and system, as appropriate:
 - 1. Description of unit and component parts:
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data, and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
 - 2. Operating Procedures:
 - a. Start-up, break-in, routine, and normal operating instructions.
 - b. Regulation, control, stopping, shut-down, and emergency instructions.
 - c. Summer and winter operating instructions.
 - 3. Maintenance Procedures:
 - a. Routine operations.
 - b. Guide to "trouble-shooting".
 - c. Disassembly, repair, and reassembly.
 - d. Alignment, adjusting, and checking.
 - 4. Servicing and lubrication schedule including list of lubricants required.
 - 5. Manufacturers' printed operating and maintenance instructions.
 - 6. Description of sequence of operation by control manufacturer.
 - 7. Original manufacture's parts list, illustrations, assembly drawings, and diagrams required for maintenance, including:
 - a. Predicted life of parts subject to wear.
 - b. Items recommended to be stocked as spare parts.
 - 8. Control diagrams by manufacturer of controls as installed in project.
 - 9. Coordination drawings and color coded piping diagrams.
 - 10. Charts of valve tag numbers, with the location and function of each valve.
- B. Content, for each electric and electronic system as appropriate:
 - 1. Description of system and component parts:
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data, and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
 - 2. Circuit directories of panelboards:

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- a. Electrical service.
 - b. Controls.
 - c. Communications.
3. As-installed color coded wiring diagrams.
 4. Operating procedures:
 - a. Routine and normal operating instructions.
 - b. Sequences required.
 - c. Special operating instructions.
 5. Maintenance procedures:
 - a. Routine operations.
 - b. Guide to "trouble-shooting."
 - c. Disassembly, repair and reassembly.
 - d. Adjustment and checking.
 6. Manufacturer's printed operating and maintenance instructions.
 7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

3.04 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in the operation, adjustment and maintenance of all products, equipment, and systems installed in project.
 1. Provide services of factory trained instructors from the manufacturer of each major item of equipment or system.
 2. Provide for each instruction session or "in-service", a DVD Camcorder operator and **DVD Camcorder** to record the session. DVD recordings shall be clearly labeled as to project, subject, and date. Submit DVDs in triplicate.
- B. Operating and maintenance manual shall constitute the basis of instruction.
 1. Review contents of manual with personnel in full detail to explain all aspects of operation and maintenance.
 2. Review instructions on how to efficiently use state required energy conservation features, materials, components, and mechanical devices.

END OF SECTION

SECTION 01 78 30

WARRANTIES, GUARANTEES, AND BONDS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: General requirements for written warranties, guaranties, and bonds required by the Contract Documents.
- B. Referenced Sections:
 - 1. Section 01 77 00 – Closeout Procedures: Submittal of Final Verified Reports and Notice of Completion, as a condition of project acceptance and payment.
 - 2. Section 01 78 39 – Project Record Documents as a condition of project acceptance and payment.
 - 3. Section 01 78 23 – Operation and Maintenance Data: Incorporation of warranties, guaranties, and bonds into instruction manuals.
- C. **Approval of the warranties, guaranties, and bonds by the Owner is a prerequisite to payment at Substantial Completion and agendizing for acceptance by the Governing Board of the Owner.**

1.02 TIME PERIOD

- A. Deliver manufacturers' warranties, guaranties, and bonds required by Contract Documents, with Owner named as beneficiary. Where manufacturers' warranty or guaranty extends for a longer time period than the Contractor's warranty and guaranty, deliver manufacturer's warranties or guaranties in same manner.

1.03 WARRANTY/GUARANTY FORM

- A. Submit written warranties and guaranties, except manufacturer's standard printed warranties and guaranties, on the Contractor's, subcontractors', material suppliers', or manufacturers' own letterhead, addressed to Owner, in the form attached to this Section.
- B. Submit warranties and guaranties in duplicate, and in the form indicated, signed by cognizant entities, and by Contractor in every case, with modifications as approved by Owner to suit the conditions pertaining to the warranty or guaranty.

1.04 SUBMITTALS

- A. Collect and assemble written warranties and guaranties into bound booklet form, and deliver bound books to Architect for delivery to Owner for final review and approval.
 - 1. See Sections 01 77 00 and 01 78 23 for additional submittal requirements.

ATTACHMENT: Warranty/Guaranty Form

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WARRANTY/GUARANTY FORM

FOR _____ WORK

We, the undersigned, do hereby warranty and guaranty that the parts of the work described above which we have furnished or installed for:

(PROJECT NAME)

are in accordance with the Contract Documents and that all said work as installed will fulfill or exceed all the Warranty and Guaranty requirements. We agree to repair or replace work installed by us, together with any other work which is displaced or damaged by so doing, that proves to be defective in workmanship, material, or operation within a period of _____ () year(s) from the date Notice of Completion is registered with the San Diego County Recorder, ordinary wear and tear and unusual neglect or abuse excepted.

In the event of our failure to comply with the above-mentioned conditions within a reasonable time period determined by the Owner, after notification in writing, we, the undersigned, all collectively and separately, hereby authorize the Owner to have said defective work repaired and/or replaced and made good, and agree to pay to the Owner upon demand all moneys that the Owner may expend in making good said defective work, including all collection cost and reasonable attorney fees.

Date: _____
(Subcontractor, Sub-subcontractor, Manufacturer or Supplier)

By: _____

Title: _____

State License No: _____

Local Representative: For maintenance, repair, or replacement service, contact:

Name: _____

Address: _____

Phone Number _____

END OF SECTION

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SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Requirements for Record Documents.
- B. Throughout progress of the work of the contract, maintain an accurate record of changes in the Contract Documents, as described below.
- C. Upon completion of the work of this Contract, transfer the recorded changes to a set of Record Documents, as described herewith.

1.02 QUALITY ASSURANCE

- A. General: Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as accepted in advance by the Architect.
- B. Accuracy of Records: Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of drawings and other documents where such entry is required to properly show the change. Accuracy of records shall be such that future searches for items shown in the Contract Documents may reasonably rely on information obtained from the accepted Record Documents.
- C. Timing of Entries: Make entries within 24 hours after receipt of information.

1.03 PAYMENT WITHHELD

- A. The Architect reserves the right to withhold certification of payment requests for failure on the part of the Contractor to maintain Record Drawings in conformance with this Section.

1.04 SUBMITTALS

- A. General: The Architect's review of the current status of Record Documents will be a prerequisite to the Architect's review of requests for progress payment and request for final payment under the contract.
- B. Progress Submittals: Prior to submitting each request for progress payment, secure the Architect's review of the Record Documents as currently maintained.
- C. Final Submittal: Prior to submitting request for final payment, submit the final Record Documents to the Architect and secure his acceptance.

1.05 PRODUCT HANDLING

- A. Maintain the job set of Record Documents protected from deterioration and from loss and damage until completion of the work and transfer of the recorded data to the final Record Documents.

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- B. In the event of loss of recorded data, use means necessary to again secure the data to the Architect's acceptance; such means shall include, if necessary in the opinion of the Architect, removal and replacement of concealing materials and, in such case, replacements shall be to the standards originally specified in the Contract Documents.

PART 2 - PRODUCTS

2.01 RECORD DOCUMENTS

- A. Job Set: Secure from the Owner, at no charge to the Contractor, one complete set of Documents comprising the Contract.
- B. Contractor shall provide the architect a pdf copy of all as-builts after the project is completed. As-builts shall include all posted CCDs and RFIs and any other documents issued during construction. As-builts shall be maintained during construction on a daily basis. Any adjustments in location of any item on the plans shall be accurately recorded on the as-built plans.
- C. Before commencing backfilling of utilities or any other underground pipes, ducts, conduits, or structures, take photographs showing relationship of below ground utilities to structure(s) or other physical reference point. Provide three-ring binder containing 3-1/2" x 5" mounted and numbered prints of photos, plus the negatives, categorized by locations and indicating utilities shown. Provide a photo(s) of all connections, crossings, stubs, or other critical points. If the Contractor neglects to take such photographs, Contractor shall uncover, at the Contractor's expense, the area(s) so neglected in order to provide the requisite photos.

Provide a hard copy and pdf copy composite Utility Site Plan with the number of each photograph placed on the plan at the location the photo was taken from, and a mark indicating which way the camera was pointed. All numbers and marks shall be in ink, and shall be clear, legible, and neatly done. Photo binder and photo plan shall be considered part of the Record Documents.

- D. Survey file, in both PDF format and CAD format with all improvements indicated and certified that all items are constructed to line and grade in accordance with the approved plans.

PART 3 - EXECUTION

3.01 MAINTENANCE OF JOB SET

- A. Identification: Upon receipt of the job set, identify each of the documents with a title "RECORD DOCUMENTS-JOB SET".
- B. Preservation:
 - 1. Considering the contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set for the review of the Architect.
 - 2. Use the job set for no purpose other than entry of new data and for review by the Architect, until start of transfer of data to final Record Documents.

3. Maintain the job set at the site of work as that site is designated by the Architect.
- C. Making Entries on Drawings: Using an erasable colored pencil (not ink nor indelible pencil), clearly describe the change by note and by graphic line, as required. Date entries. Call attention to the entry by a "cloud" around the area or areas affected. In the event of overlapping changes, different colors may be used for each of the changes. In the event of superseding changes to any area of the drawing, erase only that portion of the preceding change that is affected by the subsequent change before entering the subsequent change.
- D. Making Entries on Other Documents:
1. Where changes are caused by directives issued by the Architect, clearly indicate the change by note in ink, colored pencil, or rubber stamp, and reference Division of the State Architect approved addenda and change orders.
 2. Where changes are caused by Contractor originated proposals reviewed by the Architect, including inadvertent errors by the Contractor which have been accepted by the Architect, clearly indicate the change by note in erasable colored pencil.
 3. Make entries in the pertinent documents as reviewed by the Architect.
 4. Reference specifications section 01 77 00, Closeout Procedures, 1.02 (Closeout Schedule and Procedure) paragraph 4. Project Acceptance Requirements, Division of the State Architect for list of documents required at closeout.
- E. Conversion of Schematic Layouts:
1. In most cases on the Drawings, arrangement of conduits and circuits, piping, ducts, and other similar items, is shown schematically and is not intended to portray precise physical layout. Final physical arrangement shall be as determined by the Contractor, subject to the Architect's review. However, design of future modifications of the facility may require accurate information as to the final physical arrangement of items and location of utilities which are shown only schematically on the Drawings.
 2. Show on the job set of record Drawings, by dimension accurate to within 1 inch, the centerline of each run of items such as are described in the preceding paragraph above. Clearly identify the item by accurate note such as "cast-iron drain", "galvanized water pipe", etc. Show, by symbol or note, the vertical location of the item ("under slab", "in ceiling plenum", "exposed", etc.). Make identification sufficiently descriptive that it may be related reliably to the Specifications.
 3. The Architect may waive the requirements for conversion of schematic layouts where, in the Architect's judgment, such conversion serves no beneficial purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Architect.
 4. Timing of Entries: Be alert to changes in the work from how it is shown in the Contract Documents: Promptly, and in no case later than 24 hours after the change has occurred and been made known to the Contractor, make the entry or entries required.

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- F. Accuracy of Entries: Use means necessary, including proper instruments or tools for measurement, to determine actual locations of the installed items.

3.02 FINAL RECORD DOCUMENTS

- A. General: The purpose of the final Record Documents is to provide factual information regarding the work, both concealed and visible, which will enable future modification of design to proceed without lengthy and expensive site measurement, investigation, and examination.
- B. Review of Recorded Data Prior to Transfer: Following receipt of the pdf (Blue Beam Review compatible) as-builts described here-in-above, and prior to start of transfer of recorded data thereto, secure a review by the Architect of recorded data. Make required revisions.
- C. Transfer of Data to Drawings: Carefully transfer change data shown on the job set of Record Drawings to corresponding sepias, coordinating the changes as required, and clearly indicating at each affected detail and other drawing the full description of changes made during construction and the actual location of items described above. Call attention to each entry by drawing a cloud around the area or areas affected. Make change entries on the as-builts neatly, consistently, and in ink or crisp black pencil.
- D. Transfer of Data to Other Documents: If the documents other than drawings have been kept clean successfully during progress of the work, and if entries have been sufficiently orderly thereon and reviewed by the Architect, the job set of those documents (other than drawings) will be accepted by the Architect as the final portion of the record documents. If any such document is not so accepted by the Architect, secure a new copy of that document from the Architect at the Architect's usual charge for reproduction carefully transfer the change data to the new copy and obtain the acceptance of the Architect.
- E. Review and Approval: Submit the completed total set of Record Documents in both hard copy and in pdf format to the Architect as described above. Participate in review meeting or meetings as required by the Architect, make required changes in the Record Documents, and promptly deliver the final Record Documents to the Architect.

3.03 CHANGES SUBSEQUENT TO ACCEPTANCE

- A. The Contractor shall have no responsibility for recording changes in the work subsequent to acceptance of the work by the Owner, except for changes resulting from replacements, repairs, and alterations made by the Contractor as a part of his guarantee. No changes will be allowed without approval of the Division of the State Architect.

END OF SECTION

SECTION 01 91 13

GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Owner's Project Requirements (OPR) and Basis of Design (BoD) documentation are included by reference. These documents are for information only and will be furnished upon request.

1.02 SUMMARY

- A. Section includes general requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.
- B. Related Sections:
 - 1. Division 1 Section "Operations and Maintenance Data" for requirements for documentation for operation and maintenance of commissioned systems and equipment.
 - 2. Division 1 Section "Sustainable Design Requirements (CHPS)" for additional information related to required commissioning processes and activities.

1.03 DEFINITIONS

- A. BoD: Basis of Design. A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
- B. CHPS: Collaborative for High Performance Schools a non-profit organization.
- C. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.
- D. CxA: Commissioning Authority.
- E. EDR: Energy Design Resources (EDR) is an organization funded by California utility customers under the auspices of the California Public Utilities Commission. They offer decision-making tools and resources that help make it easier to design, build and operate more energy-efficient buildings in California.
 - 1. EDR's software commissioning assistant, "Cx Assistant," is available at the following web site:
 - a. <http://www.energydesignresources.com/Resources/SoftwareTools/CommissioningAssistant.aspx>.

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- F. OPR: Owner's Project Requirements. A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information. Address HVAC, lighting, indoor environment, energy efficiency, site, water use and other factors affecting the environmental responsiveness of the facility.
 - 1. Design Intent Documents (DID): Shared meaning element with OPR; may be used interchangeably.
- G. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.04 COMMISSIONING TEAM

- A. Members Appointed by Contractor(s): Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action. The commissioning team shall consist of, but not be limited to, representatives of Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.
- B. Members Appointed by Owner:
 - 1. CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.
 - a. The CxA, as an independent third party, may not be a member of the design team for the project.
 - 2. Representatives of the facility user and operation and maintenance personnel.
 - 3. Architect and engineering design professionals.

1.05 OWNER'S RESPONSIBILITIES

- A. Provide the OPR documentation, prepared by the Commissioning Team and approved by Owner, to the CxA and Contractor for information and use.
- B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.
- C. Provide the BoD documentation, prepared by Architect and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.06 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:
 - 1. Evaluate performance deficiencies identified in test reports and, in collaboration

with entity responsible for system and equipment installation, recommend corrective action.

2. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
3. Attend commissioning team meetings.
4. Integrate and coordinate commissioning process activities with construction schedule.
5. Review and accept construction checklists provided by the CxA.
6. Complete paper construction checklists as Work is completed.
 - a. Provide completed checklists to the Commissioning Authority not less than weekly.
7. Review and accept commissioning process test procedures provided by the Commissioning Authority.
8. Complete commissioning process test procedures.

1.07 CxA'S RESPONSIBILITIES

- A. Administrative: Organize and lead the commissioning team.
- B. Provide commissioning plan.
- C. Commissioning Meetings: Convene, attend and direct commissioning team meetings. At the discretion of the Architect, these meetings may be combined with the job progress meetings. Commissioning meetings shall be scheduled weekly.
- D. Construction Checklists: Provide Project-specific construction checklists and commissioning process test procedures.
- E. Issues Log: Prepare and maintain the Issues Log.
- F. Check List Log: Prepare and maintain completed construction checklist log.
- G. Independent Verification: Witness systems, assemblies, equipment, and component startup.
- H. Quality Control: Verify the execution of commissioning process activities using random sampling. The sampling rate may vary from 1 to 100 percent. Verification will include, but is not limited to, equipment submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with the OPR. When a random sample does not meet the requirement, the CxA will report the failure in the Issues Log.
- I. Final Commissioning Report: Compile test data, inspection reports, and certificates; include them in either the systems manual or the commissioning process report. List each commissioned system and assembly, and include the following items, as a minimum:
 1. CxA's statement of the system's or assembly's compliance with the OPR.
 2. Description of the OPR.

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3. Description of the project specifications.
4. Verification of installation (construction checklist disposition).
5. Functional performance testing and forms.
6. Operations and maintenance data evaluation.
7. Training program evaluation.
8. Value of the commissioning process.
9. Outstanding issues.

**PART 2 - PRODUCTS
(Not Applicable)**

**PART 3 - EXECUTION
(Not Applicable)**

END OF SECTION

02 00 00

SITE WORK

SANTEE SCHOOL DISTRICT

SECTION 02 41 19

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Project site and building demolition work to prepare for addition of new improvements, as indicated on the Drawings and specified herein. General and Special Conditions and Division 1 specification sections apply to this section.
- B. Related Sections:
 - 1. Section 01 73 29, Cutting and Patching
 - 2. Section 01 50 00, Temporary Facilities and Controls
 - 3. Section 01 77 00, Closeout Procedures
 - 4. Section 31 20 00, Earth Moving
 - 5. Section 33 44 19, Utility Storm Water Treatment

1.02 DEFINITIONS

- A. "Remove": Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.
- B. "Removed and Salvaged": Items to remain the Owner's property shall be removed, cleaned, and packed or crated to protect against damage.
 - 1. Identify contents of containers and deliver to Owner's designated storage area.
- C. "Existing to Remain" Protect construction indicated to remain against damage and soiling during demolition. When permitted by the Architect, items may be removed to a suitable, protected storage location during demolition and then cleaned and reinstalled in their original locations.
- D. "Remove and Reinstall": Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in locations indicated.
- E. Salvaged Materials (not wanted by Owner): Items which the Owner does not want and is of salvageable value to Contractor may be removed from structure as work progresses. Owner and CBC require a minimum of 50% (by weight) of all non-hazardous construction materials be recycled, composted and/or salvaged. Salvage shall conform to the following:
 - 1. Contractor shall submit salvage plan showing how all materials are to be sorted, salvaged and recycled. Plan must include all final destinations for each type of material.
 - 2. Salvaged items must be transported from site as they are removed, unless materials are to be reused on site.
 - 3. Storage or sale of removed items on site will not be permitted, unless materials are to be reused on site.
 - 4. Contractor shall provide certification for all salvaged materials. Certifications may take the form of receipts from recycling facilities, manufacturers, or any other legitimate form of certification. Certification types shall be outlined in

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salvage plan and approved by Owner.

1.03 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition by the Contractor(s) in a legal disposal area appropriate to the materials being disposed.

1.04 SUBMITTALS

- A. Submit each item in this Article according to the Conditions of the Contract and Specifications Section 01 33 00, unless otherwise indicated.
- B. Proposed Dust Control Measures.
- C. Proposed Noise Control Measures.
- D. Schedule of demolition activities indicating the following:
 - 1. Detailed sequence of demolition, salvage, and removal work, with starting and ending dates for each activity.
 - 2. Dates for shutoff, capping, and continuation of utility services.
- E. Salvage Plan - Inventory of items to be removed and salvaged. Salvage plan shall show how all materials are to be sorted, salvaged and recycled. Plan must include all final destinations for each type of material.
- F. Inventory of items to be removed and salvaged and deliver to Owner's designated storage area.
- G. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and improvements that might be misconstrued as damage caused by demolition operations.
- H. Record drawings at project closeout according to specifications section 01 77 00 - Closeout Procedures shall identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.

1.05 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: Engage an experienced firm that has successfully completed demolition work similar to that indicated for this Project.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before starting demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Pre-demolition Conference: Conduct conference at Project site with Owner, Architect and Construction Manager.

1.06 PROJECT CONDITIONS

- A. Building, where partial wall will be demolished, will be vacated and its use discontinued

before start of the Work.

- B. Conditions, existing at time of inspection for bidding purpose, will be maintained by Owner as far as practical.
- C. Hazardous Materials: If applicable, a Hazardous Materials Study was performed on site and a specification for removal of said materials is incorporated into the project documents.

1.07 SCHEDULING

- A. Arrange demolition and salvage schedule so as not to interfere with Owner's on-site operations.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of demolition required.
- C. Inventory and record the conditions of items to be removed and reinstalled and items to be removed and salvaged.
- D. Survey condition of the building to determine whether removing any element might result in a structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during demolition.
- E. Perform surveys as the Work progresses to detect hazards resulting from demolition activities.

3.02 UTILITY SERVICES

- A. Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.
- B. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by Owner, and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to governing authorities.
- C. Provide not less than 72 hours notice to Owner if shutdown of service is required during changeover.
- D. Utility Requirements: Refer to Division 21 through Division 26 sections for shutting-off, disconnecting, removing, and sealing or capping utility services. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.03 PREPARATION

- A. Conduct demolition operations and remove debris to ensure minimum interference with

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roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- B. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around demolition area.
1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways.
 2. Protect existing site improvements, appurtenances, and landscaping to remain.
- C. Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of building to remain.
1. Strengthen or add new supports when required during progress of demolition.

3.04 EXPLOSIVES

- A. The use of explosives will not be permitted.

3.05 POLLUTION CONTROLS

- A. Use water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations.
1. Do not create hazardous or objectionable conditions, such as flooding, and pollution, when using water.
- B. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level.
- C. Clean adjacent buildings and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing before start of demolition.

3.06 DEMOLITION

- A. Demolish partial building wall, concrete and/or asphalt paving, interior finishes, fixtures and accessories, as required to prepare for new construction, and remove from the site.
- B. Locate demolition equipment throughout the building and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- C. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.
- D. Fill below-grade areas and voids resulting from demolition of building elements and pavements and soil materials according to requirements specified in Section 31 20 00 – Earth Moving and/or geotechnical report.

- E. Promptly repair damages to adjacent facilities caused by demolition operations.

3.07 DISPOSAL OF DEMOLISHED MATERIALS

- A. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
- B. Burning demolished materials is not allowed.
- C. Transport demolished materials off Owner's property and legally dispose of these materials.

END OF SECTION

03 00 00

CONCRETE

SANTEE SCHOOL DISTRICT

SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Completion of subgrade preparation, formwork, ties, shoring, bracing, anchorage and blockouts as indicated on the Drawings and specified herein.
- B. Related Sections:
 - 1. Curbs, Gutters, Sidewalks and Driveways; refer to Section 32 16 00.
 - 2. Concrete Reinforcing; refer to Section 03 20 00.
 - 3. Cast-in-Place Concrete; refer to Section 03 30 00.
 - 4. Rough Carpentry; refer to Section 06 10 00.

1.02 REFERENCED STANDARDS

- A. Refer to Section 01 42 19 for information concerning availability and use of references.
 - ACI 117-90 - Tolerances for Concrete Construction & Materials
 - ACI 347R-94 - Formwork for Concrete
 - ANSI/AHA A135.4 - Basic Hardboard
 - ASTM D1751 - Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous types)
 - CRD-C-572-74 - Polyvinyl chloride Waterstops
 - DOC PS-1-95 - Construction and Industrial Plywood
 - WCLIB Std. No. 17. - Grading Rules for West Coast Lumber
 - WWPA - Western Lumber Grading Rules 2011 with Supplements
- B. Conform to the requirements of Section 01 45 23 – Testing and Inspection Services.
- C. Construct and erect formwork in accordance with ACI 318 and 347, and Section 1905A of the California Building Code (CBC) Title 24, Part 2.
- D. Design forms and falsework to adequately support live and dead loads, including equipment, concrete drops, pressures of foundations, etc.
- E. Follow recommendations of ACI 318 and 347.
- F. Title 24, Parts 1 and 2, California Building Code.

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1.03 ARCHITECT'S REVIEW

- A. Architect will review formwork for architectural suitability where exposed concrete finish occurs. Contractor shall be responsible for design of formwork for structural stability and sufficiency.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Earthen Forms: Provide earthen forms for footings only where the soil is firm and stable and the concrete will not be exposed, and subject to approval of the Division of the State Architect. Cut earthen forms square, neat and accurate to size. Clean bottoms of excavations.
- B. Wood Forms: Provide wood forms, based on PS 1-95 Plywood or B-B Class I exterior, high density overlaid one side for forms, sound, undamaged, and clean, 5/8-inch thick minimum for exposed concrete work.
 - 1. Lumber: Provide Douglas fir, construction grade lumber for framing, studding and bracing.
 - 2. For site walls provide HDO or HDO 7-layer minimum grade B-B for all exposed walls.
- C. Exposed Architectural Concrete: HDO or HDO B-B 7 Ply minimum for a smooth architectural finish. Seal all joints and edges.

2.02 COMPONENTS

- A. Formed Construction Joints: Provide minimum 24 gage galvanized steel foam filled type, with release tape sealed slots, bent tab anchors, securable to formwork.

2.03 ACCESSORIES

- A. Provide accessories and anchorages required, of sufficient strength, length and character to maintain formwork during pouring operations.
- B. Use anchors and hangers which do not leave exposed metal at surface.
- C. Use snap-off, removable, or adjustable type metal ties, hot-dip galvanized. Provide standard metal form clamp assembly, spreader type leaving no metal within 1 inch of concrete exposed face. Leave inner tie rod within concrete when forms are removed.
- D. Provide colorless mineral oil type form coating, non-grain raising and non-staining type, Nox-Crete Company Nox-Crete Form Coating, or other approved equal.
- E. Rigid foam plastic fillets may be used for chamfered corners.

PART 3 - EXECUTION

3.01 EXAMINATION

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

required of this section.

- B. Inspect forms in accordance with Title 24, Part 2, Section 1705A.3.5, California Building Code.

3.02 PREPARATION

- A. Earthen Forms: Trench earthen forms at least two inches wider than footing widths shown on drawings. 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. Tap form and clean debris and loose materials in earthen forms before depositing concrete.
- B. Design of forms and shoring in excess of 3 feet in height, shall be by a California State registered Civil Engineer.
- C. Verify accuracy of lines, levels, and centers.
- D. All embedded items must be installed prior to placement of concrete - NO EXCEPTIONS.

3.03 APPLICATION

- A. 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.
- B. Align joints and make them watertight.
- C. Set reinforcing accurately and ensure secure placement.
- D. Maintain tolerances of ACI 347, within 1/8-inch in 10 feet and 1/4" maximum deviation from theoretical dimensions. Exposed concrete may require tighter specifications.
- E. Assist in setting and placing blockouts and sleeves for materials and products to be embedded in and passing through concrete.
- F. Set screeds and establish levels for tops of concrete for finish surfaces. Shape surfaces as indicated on drawings.
- G. Screenshot supports for concrete over waterproof membranes or vapor barriers shall be of a cradle, pad, or base type which will not puncture membrane.
- H. Wet formwork prior to placing concrete and keep wet during concrete curing process.

3.04 PROTECTION

- A. 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.
 - 1. Verify strengths by compressive strength test results. Loosen forms carefully. Do not wedge pry bars, hammers or other tools against masonry and concrete surfaces.

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B. In addition to California Building Code Section 1905A, the following are minimum times for forms and shoring to remain in place prior to removal:

1. Footings and grade beams - 5 days.
2. Walls and columns - 14 days.
3. Beam sides - 10 days.
4. Beam and slab soffits - 28 days - Add temporary reshoring requirement.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Completion of reinforcing steel bars, welded wire fabric, support chairs, bolsters, bar supports, and spacers as indicated on the drawings and specified herein.
- B. Related Sections:
 - 1. Curbs, Gutters, Sidewalks and Driveways; refer to Section 32 16 00.
 - 2. Cast-in-Place Concrete; refer to Section 03 30 00.

1.02 QUALITY ASSURANCE

- A. Conform to the testing and inspection requirements of Section 01 45 23 – Testing and Inspection Services.
- B. Perform reinforcing work in strict conformance with Chapter 19A, Title 24, California Building Code (CBC) and CRSI, unless specified otherwise or required otherwise by local code jurisdiction.

1.03 REFERENCES STANDARDS

- A. Refer to Section 01 42 19 – Reference Standards for information concerning availability and use of references.
 - ACI SP-66(04) - Detailing Manual
 - ACI 318-08 - Building Code Requirements for Structural Concrete
 - ASTM A82 - Steel Wire, Plain, for Concrete Reinforcement
 - ASTM A185 - Steel Welded Wire Reinforcement, Plain, for Concrete
 - ASTM A497 - Steel Welded Wire Reinforcement, Deformed, for Concrete
 - ASTM A615 - Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
 - ASTM A706 - Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
 - CRSI MSP - Manual of Standard Practice
 - AWS A5.1: - Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding
 - AWS A5.5: - Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding
 - AWS D1.4: - Structural Welding Code—Reinforcing Steel
- B. In addition to CRSI specifications, follow ACI 315 and 318, AWS welding codes and qualifications, and ASTM A185, A615 and A706.

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- C. Testing of bars in accordance with Title 24, Section 1913A and 1913A.4, Part 2.

1.04 TESTING

- A. Comply with Title 24, Section 1913A
- B. Where samples are taken from bundles as delivered from the mill, with the bundles identified as to heat number, and provided that the mill analysis 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
- C. 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.
- D. Testing Laboratory shall perform chemical analysis of reinforcing for suitability for welding prior to welding. Welding reinforcing bars shall comply with ASTM A706.

1.05 SUBMITTALS

- A. The Contractor shall be responsible for providing steel reinforcing as indicated on the Drawings for concrete reinforcing and as specified herein. Prepared Shop Drawings shall be reviewed by the Architect or Structural Engineer.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Do not allow reinforcing materials to have direct contact with the ground. Cover materials adequately to prevent rusting and contact with materials or construction injurious to proper bonding.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Reinforcing Bars: Deformed billet steel reinforcing bars, ASTM A615, plain finish (except ASTM A706 for welded bars where called for), see Drawings for grade.
 - 1. When welding is required, provide reinforcing bars conforming to ASTM A706, including the additional requirements of AWS D1.4, as modified by 2019 CBC Standard Chapter 19A.
 - 2. Where called for, provide ASTM A706.

2.02 ACCESSORIES

- A. Welded Wire Fabric: Provide plain type, ASTM A185, in coiled rolls, plain finished, void of rust, dust, scale, paint, grease and other coatings.
- B. Provide minimum 16 gauge galvanized annealed tie wires, and chairs, bolsters, bar supports, and spacers sized and shaped for strength and support of reinforcing. Plastic accessories may be acceptable if approved by Architect prior to use.

2.03 FABRICATION

- A. Fabricate in accordance with details shown.

- B. Accurately bend, cut and place bars as shown on Drawings and in accordance with the requirements of Title 24, Part 2, Section 1905A and ACI 318. Bend bars cold; heating of bars is not permissible. Do not bend or straighten bars in any manner that will injure materials.
- C. Welding: Reinforcing to be welded shall comply with the requirements of Title 24, Part 2, Section 1903A.8 and ACI 318. Perform welding, where shown or approved, by the direct electric arc process in accordance with AWS D1.4 using E90 series low hydrogen electrodes., except E80 for ASTM A706, GRW reinforcing. 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.
 - 1. Employ only experienced certified welding operators.
 - 2. Prequalification of welds are to be in accordance with code and carbon equivalent of reinforcing not exceeding 0.75.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. 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.

3.02 INSTALLATION

- A. Fabricate reinforcing in accordance with ACI 315. Locate reinforcing splices not shown on drawings, at points of least stress. Where shown or required, weld reinforcing bars in accordance with AWS D1.4.
- B. Place reinforcing supported and secured against displacement. Do not deviate from true alignment.
- C. Ensure that reinforcing used is clean, free of scale, dirt, dust, rust and other matter.
- D. Provide lap splices for bars noted as "cont.". Provide a Class "B" lap splice in concrete and 72 bar diameters in masonry. Wire all laps and splices in welded wire mesh and provide side and end laps of at least 6 inches.
 - 1. Spacing - minimum center-to-center distance between parallel reinforcing bars is to be in compliance with that shown on drawings, or in the absence of such information on drawings, the clear spacing is to be one bar diameter, but in no case less than 1-1/2 inch, nor less than 1-1/3 times the maximum size of aggregate.
 - 2. Where possible, stagger splices of adjacent vertical bars.
- E. Only splice reinforcing where shown or noted. Splices at other locations must be approved by the Architect. Provide continuous reinforcement between splice locations in

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vertical walls. No splices of vertical wall reinforcing may occur except at foundations, unless specifically approved by Division of the State Architect, and the Architect.

1. Securely tie reinforcing with 16 gage tie wire at all splices and intersections, and as may be directed.
 2. Point ends of wire ties away from forms.
- F. Stagger splices in adjacent horizontal wall reinforcing bars a minimum of 4 feet.
- G. Provide dowels in footings and/or grade beams the same size and number as vertical wall or column reinforcing. Provide a minimum dowel projection equal to Class "B" lap splices unless noted otherwise.
1. Securely tie dowels in place before depositing concrete. Install No. 3 bars for securing dowels where no other reinforcement is provided.
- H. Provide the minimum coverage of reinforcing by concrete:

MINIMUM COVER:
Inches (mm)

1. Cast against and permanently exposed to earth..... 3 (76)
 2. Concrete exposed to earth or weather:
No. 6 through No. 18 bar..... 2 (51)
No. 5 bar, W31 or D31 wire, and smaller..... 1-1/2 (38)
 3. Concrete not exposed to weather or in contact with ground: Slab, walls, Joists:
No. 14 and No. 18 bar..... 1-1/2 (38)
No. 11 bar and smaller..... 3/4 (19)
 4. Beams & Columns:
Primary reinforcement, ties, stirrups, spirals..... 1-1/2 (38)
- I. Reinforcing bars shall not be re-bent.

3.03 APPLICATION

- A. Correction during concreting: Maintain capable steel workers during placement of concrete for properly resetting reinforcement displaced by runways, workers, or other causes.
- B. Reinforcement: As a minimum for slab reinforcement, provide 6 x 6 W4.0 x W4.0 wire mesh ASTM A185, if no other reinforcement is indicated.

3.04 DEFECTIVE WORK

- A. 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:
1. Bars with kinks or bends not shown on Drawings.
 2. Bars injured due to bending or straightening.

3. Bars heated for bending.
4. Reinforcement not placed in accordance with Drawings or Specifications.
5. Rusty or oily reinforcement.

3.05 FIELD QUALITY CONTROL

- A. Refer to Section 01 45 23 - Testing and Inspection Services for requirements.
- B. Prior to pouring concrete, notify all parties to the inspections, that reinforcing is ready for inspections. Secure approvals by testing laboratory and inspector before concrete operations commence.

3.06 CURING

- A. Concrete (other than high-early-strength) shall be maintained above 50 degrees F. and in a moist condition for at least the first seven (7) days after placement, except when cured in accordance with Section 1905A, CBC.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Completion of sand bed, vapor barrier, cast-in-place concrete, and finishes as indicated on the drawings and specified herein.
- B. Related Sections:
 - 1. Curbs, Gutters, Sidewalks and Driveways; refer to Section 32 16 00.
 - 2. Concrete Forming and Accessories; refer to Section 03 10 00.
 - 3. Formwork, Earthen forms: See Section 03 10 00 Concrete Forming and Accessories.
 - 4. Concrete Reinforcing: See Section 03 20 00.

1.02 QUALITY ASSURANCE/SUBMITTALS

- A. Conform with the requirements of Section 01 45 23 - Testing and Inspection Services.
- B. Perform concrete work in accordance with ACI 301 and 318, unless specified otherwise. Provide continuous inspection and testing for concrete placement in accordance with Sections 1701A and 1913A Title 24, Part 2, California Building Code.
- C. Sample Panels: When and where instructed to do so, provide on-site sample panel with specified finishes. Construct additional panels as may be necessary to gain approval of finishes desired. After rejection of panel, remove from site immediately. Approved and reviewed panel is to be left in place at site for project duration as a project standard.
- D. Testing Laboratory Services:
 - 1. Owner will employ and pay for an Independent Testing Laboratory to review the various concrete mixes required to produce concrete of the strengths required for the project. Submit and obtain approvals before proceeding with the work. Concrete mix shall be designed per Title 24, Part 2, Section 1904A.2
 - 2. Separately, Owner will employ and pay for a testing laboratory to perform tests and inspections, but the cost of subsequent and additional testing and inspections due to failed items will be back charged to the Contractor.
- E. Submit design mixes to Architect for Structural Engineer, and Testing Lab review and approval. Contractor shall pay for review of more than two (2) designs for each strength required.
- F. Submit shrinkage test for each design minimum. Perform the following shrinkage tests for lightweight concrete, for each 150 cubic yards and fraction:
 - 1. Specimens - 4-inch x 4-inch and 11 inch long bars, cured for seven (7) days in a moist room and as specified in ASTM C157. Make measurements at 7 day

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intervals until 35 days of curing has elapsed.

2. Allowable shrinkage of lightweight concrete used on project is not to exceed 0.05 percent after the 35 days of curing has elapsed.

1.0 REFERENCE STANDARDS

- A. Refer to Section 01 42 19 – Reference Standards for information concerning availability and use of references.

ACI 318 - Building Code Requirements for Structural Concrete and Commentary

ASTM C33 - Standard Specification for Concrete Aggregates

ASTM C94 - Standard Specification for Ready-Mixed Concrete

ASTM C114 - Standard Test Methods for Chemical Analysis of Hydraulic Cement

ASTM C156 - Standard Test Method for Water Loss [from a Mortar Specimen] through Liquid Membrane-Forming Curing Compounds for Concrete

ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete

ASTM C227 - Standard Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method)
- B. All work under this section shall be in accordance with applicable provisions of CBC, Title 24, Part 2, Chapter 19A.
- C. Refer to the following information for compliance of materials, products, and installation techniques: ASTM C33, C94, C150, C260, C494 and ACI 301, 304R-00 and 305R-99.
- D. Handling and Placing: Concrete transported and placed as per ACI 318. Concrete shall be thoroughly compacted and worked into forms around reinforcing steel using suitable equipment. Vibrating of formwork will not be permitted.
- E. Where conditions make placing difficult or reinforcing is congested, batches containing the same proportions of sand and cement used in the concrete plus a maximum of 50 percent of coarse aggregate shall be used.
- F. Inspections: Notify the Architect, Structural Engineer, and the Division of the State Architect (DSA) at least forty-eight hours in advance of the first pour of concrete and sufficiently in advance of subsequent pours, see 1704A, Title 24, Part 2, California Building Code and chapter 7, section 7-145, Title 24, Part 1, California Administrative Code.
- G. Testing: The Inspector will take at least four cylinders of concrete from each day's run of 50 yards, or 2,000 sq. ft. of surface area for slabs, or fractional part thereof, per ACI 318. Field specimens of concrete taken and tested in accordance with CBC Standard. Label each cylinder with job name, date, number, result of slump test, and the point in the pour in the structure from which the sample was taken noted thereon. One cylinder shall be tested at seven days and two at 28 days. The fourth cylinder shall be stored for 56 days unless instructed otherwise. Core test to comply with ACI 318 if cylinder tests indicate deficiencies.

- H. Embedded Items: Pipes and conduit in concrete, located, sized and if required, sleeved in accordance with the requirements of ACI 318. Bolts and anchorage devices embedded in concrete to fastened sills, tie-down columns and other structural and framing members to concrete installed and secured in place before concrete is placed.
1. Concrete shall be placed in a continuous operation between predetermined joint locations. Location of construction joints shall be as shown on the drawings or at locations approved by the Engineer and the Division of the State Architect.
 2. Joints shall be straight, exactly horizontal or vertical and the surface of the concrete shall be level wherever a run is stopped. Reinforcement shall be extended through joints or dowels to develop the full strength of the reinforcement. Construction joints shall be per ACI 318.

1.04 TESTING

- A. Provide free access to work. Provide laboratory design mix. No substitutions will be accepted. Cement and aggregates shall be tested.
- B. Cement: Test Portland cement in accordance with Sections 1913A.1, Title 24, Part 2, and Section 3.2, ACI 318.
- C. Core Tests: Take and test composite construction cores in accordance with Section 1913A.4, Title 24, Part 2
- D. Batch Plant Inspection: Provide in accordance with Section 1705A.3.2, Title 24, Part 2.
- E. Placing Record: Keep records of placing in accordance with Section 1705A.3.6, Title 24, Part 2.
- F. Cylinder Test: Provide in accordance with Section 1913A.4, Title 24, Part 2.
- G. Slump Test: Provide in accordance with ASTM C143 for each set of test cylinders.
- H. Placing Inspection: Provide in accordance with ACI 318.
- I. Moisture Testing: All slabs to receive flooring materials other than ceramic tile shall be calcium chloride dome tested at least 54 days after placement. Readings exceeding requirements of flooring manufacturer (generally 3 lbs. per 1,000 s.f. per 24 hours) will require retesting prior to installation of flooring. Readings in excess of 5 lbs. per 1000 s.f, will require testing by Owner using petrographic analysis to determine water/cement ratio at time of placement.
1. All tests in areas where concrete was placed with a water/cement ratio in excess of .45 will be paid for by Owner, but may be back charged to Contractor.
- J. Compaction Testing: Provide in accordance with ASTM D689.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cement: For site walls – Colton II - Provide ASTM C150 TYPE II/V conforming to requirements of 1903A.3, Title 24, Part 2. If aggregates contain reactive substances, reactive with cement alkalies they may not be used.

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B. Aggregates:

1. Base and Aggregate base shall conform to the State of California, Department of Transportation (CALTRANS) Standard Specifications, Current Edition. All base, whether called out as aggregate base or base shall be in conformance with CALTRANS Section 26 for Class 2 Aggregate Base, 3/4-inch maximum. The maximum percentage of recycled material allowable shall not exceed 50% of the total volume of aggregate used.
2. Base and Aggregate Base shall be provided by a licensed commercial materials supplier. Certifications shall be submitted with each submittal. Use of on-site asphalt materials in aggregate base or base is strictly prohibited. The use of Crushed Miscellaneous Base is strictly prohibited.
3. Aggregates: ASTM C33, 1-inch maximum conforming to CBC, Title 24, Part 2, 1903A.4 Aggregates and ACI 318.

C. Curing Materials:

1. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per square yard, complying with AASHTO M182, Class 2.
2. Moisture-Retaining Cover: One of the following, complying with ASTM C171:
 - a. Curing paper
 - b. Polyethylene film
 - c. Burlap Polyethylene-coated
3. Liquid Membrane-Forming Curing Compound: Liquid type non-wax membrane-forming curing compound complying with ASTM C309, Type I, Class B. Moisture loss not more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal/ product shall be compatible with finishes to be applied to concrete.
 - a. Products: Subject to compliance with requirements, provide one of the following:

"2000 Kure 1315"	BASF Building Systems.
"Kurez W Vox"	Euclid Chemical Co.
"Sealtight 1100-Clear"	W.R. Meadows, Inc.
 - b. Surface Treatment for Slabs Receiving Wood Flooring, Sheet Vinyl, or Resilient Flooring including Sheet vinyl and Vinyl Cementitious Tile, Carpet with a Vinyl, Rubber or Unitary Type Backing: Waterproof, Seal and Cure Application, CS 2000 by Creteseal (800) 278-4273, or equivalent, Floor Seal Technology, Inc. (800) 572-2344.
4. Warranty: 15 years Labor and Materials backed by a \$1,000,000 Insurance Policy
 - a. A trained applicator shall apply CS 2000, or a technician must be on site during the spraying applications for verification to receive the 15 year warranty on floor coverings.

- b. When a floor covering system is installed on a slab treated with the product according to manufacturer's instructions, the manufacturer shall warrant the floor covering system against delamination due to negative, ground originated moisture migration or moisture-born contaminants for a period of ten years from the date of original installation.

The warranty shall cover labor and materials necessary to repair or replace the floor covering system if repair cannot be made.

5. After pouring, placing, bullfloating, final finishing, soft cutting, and the surface of the concrete has hardened sufficiently to sustain foot traffic, CS 2000 Sealer shall be applied.
 6. Apply CS 2000 Concrete Sealer at the rate of 200 square feet per gallon coverage. If puddling or bird bathing occurs, lightly broom product evenly over the substrate.
 7. Continue brooming the product evenly over the substrate until the CS 2000 product has penetrated into the concrete.
 8. Provide one of the following, or other approved equal:
 - Creteseal CS 2000.
 - Ashford Formula
 - Kure N Harden – By BASF
- D. Water: Provide clean water free from injurious substances, per Section 3.4, ACI 318.
- E. Vapor Barrier: Provide Stego Industries, 15-MIL Specifications, comply with ASTM E 1745, Class A, requirements.
- F. Admixtures: *(No Calcium Chloride)* Admixtures to be used in concrete shall be subject to prior approval by the IOR and the Division of the State Architect, CBC.
1. Water Reducing: Reduce water 5 percent minimum, increase 28 day compressive strength, decrease 21 day drying shrinkage, ASTM C494.
 2. Provide one of the following, or other approved:
 - BASF The Chemical Co. Pozzolith 300 R.
 3. Acceleration or Retarding: ASTM C494.
 4. Air Entraining: 4 percent minimum, 6 percent maximum air content by volume, ASTM C260.
 5. Admixtures shall be in accordance with Title 24, Part 2, 1903A.6 and Section 3.6 ACI 318.
 6. Concrete Sealer: Dayton Superior "Cure & Seal 309 J18", W.R. Meadows "VOCOMP®-25", or Sonneborn® Products "Kure-N-Seal W" as manufactured by BASF.
 - a. For site walls use Sinak HLQ 125.
 - b. 3000 psi concrete 3/8" – 1/2" aggregate.

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7. Non-Slip Surface: Trowel finish aluminum oxide grains, at exterior stairs and where indicated on the Drawings.
8. Add shrinkage reducing agent, such as "Eclipse®" as manufactured by Grace Construction Products or Peramin® SRA as manufactured by Peramin.

2.02 COMPONENTS

- A. Non-Shrink Grout: Premixed compound consisting of non metallic aggregate, cement, water reducing and plasticizing agents, capable of developing non-shrink characteristics in both the horizontal and vertical direction with minimum compressive strength of 4,800 p.s.i. in two (2) days, and 6,000 p.s.i. in twenty-eight (28) days.
 1. Provide Embeco Grout as manufactured by BASF, or other approved by Five Star, Dayton Superior, or Sika.
- B. Cement Grout and Drypack: Precision support grout shall be BASF Masterflow® 713 Grout as manufactured by Master Builders, Cleveland, Ohio consisting of a hydraulic cementitious system, specially graded and processed natural fine aggregate and additional technical components. Other products will only be acceptable providing written approval of the Engineer is obtained prior to bidding. Acceptance will be granted only upon satisfactory evidence proving that the substitute material meets the following requirements, conforming to CRD C-621 Corps of Engineers.
 1. Free of gas producing or releasing agents.
 2. Free of oxidizing catalysts.
 3. Free of inorganic accelerators, including chlorides.
 4. Drypack: Pre-mixed grout shall be used. Use only enough water to make a stiff mix consistency. Pre-mixed grout shall be used under base plates per manufacturer's recommendations, and packed solid under pressure treated mudsills, per Structural Details, so as to obtain a continuous bearing. Minimum compressive strength of 6000psi.
- C. Joint Materials: Provide tooled joints or plastic control joints.
 1. Construction Joints: Provide metal keyed dividers for cold joints, subject to review and approval by Architect.
 2. Expansion Joint Fillers:
 - a. 1/2-inch asphalt impregnated fiber conforming to ASTM D545 Type 5, where slab abutts wall or other vertical elements.
 - b. Where joint will be finished with sealant, set expansion strip with a 1/2-inch deep removable expansion strip cap.
- D. Under Slab Vapor Barrier: 15 mil Stego Wrap, Fortifiber Building Systems, or W.R. Meadows, or equal, over 2" compacted sand. Refer to plans and Geotechnical Report for installation.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Certifications: Provide legible copies of the delivery tickets of each load of concrete with the following information:
1. Name and location of plant.
 2. Serial number of ticket.
 3. Date and truck number.
 4. Name of contractor.
 5. Name of project.
 6. Type of class of concrete and how to be used.
 7. Amount of concrete.
 8. Time loaded, time of arriving and unloading at project site.
 9. Water added at site and total water content.
 10. Type, name and amount of admixtures.
 11. Name and signature of person making slump tests.
 12. Testing number of test cylinders.

3.02 PREPARATION FOR PLACEMENT

- A. Remove foreign debris and matter which may have accumulated within forms, and close ports and openings left in formwork.
- B. Thoroughly clean tools used in transportation, placing and consolidating concrete immediately after each pour.
- C. Ensure that required inspections have taken place prior to pour.

3.03 APPLICATION

- A. Mixes: The minimum concrete ultimate twenty-eight (28) day compressive strength to be per structural drawings and shall be controlled by the following method:
1. **Designed Mix:** Concrete mixes shall be based upon previously proven mixes and material tests made by a recognized testing agency. The design of such mixes shall be based on the ultimate strength of the concrete assumed in the design of the structure and shall take into consideration both the workability of the mix and the durability of the concrete. Refer to Sections 1903A.1 and ACI 318.
 2. When strengths in excess of 3,000 pounds per square inch are required, or special aggregates not having a record of satisfactory performance are used, or admixtures are used to reduce the cement content, ACI 318, shall be used to determine the mix.
 3. Where design criteria in Title 24, Part 2, chapter 19A and ACI 318 Section 5.2, provide for the use of a splitting tensile strength value of concrete as a modifier, laboratory tests shall be made in accordance with the CBC to establish the value of f_{ct} corresponding to the specified value of f'_c .
 4. Tensile-splitting tests of field concrete shall not be used as a basis for acceptance.
 5. **Slump Limits:** Proportion and design mixes to result in concrete slump at point of

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placement not less than 1 inch and not more than 4 inches.

6. The maximum water to cement ratio shall not exceed 0.5 (50%).
7. Project specific shrinkage test. Perform test using actual proposed mix with some aggregates used in the project. Limit 28-Day shrinkage to 0.045 percent.
- B. Control Density Fill: Provide batch plant design mix of 4000 p.s.i., flowable concrete composed of 3000 lbs aggregate, 45 gals water, 50 lbs of cement and 400 lbs of flyash. Adjust proportions for materials as necessary and submit to Architect, for information.

3.04 CONVEYING

- A. Handle concrete from mixer to location of placing as rapidly as practical, avoiding separation or loss of ingredients and rehandling. Use carts, wheelbarrows, concrete pumps, conveyors or buggies to deliver concrete to location of placement.
- B. Do not permit a free fall of more than 4 feet when placing concrete.
- C. Use elephant trunk spouts for placing concrete in vertical elements. Space so that concrete does not exceed 4 foot flow horizontally.

3.05 PLACEMENT

- A. In general, place concrete in accordance with ACI 301, and in the presence of the inspecting personnel required.
- B. Ensure that anchors, seats, plates, and other items to be cast into concrete are placed, held securely, and will not cause hardship in placing concrete.
- C. Maintain records of poured concrete. Record date, location, quantity, air temperatures, and test samples taken.
- D. Ensure that reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.
- E. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent.
- F. Pour concrete continuously between predetermined construction, control and expansion joints. Pour in a checkerboard pattern, unless otherwise directed.
- G. Excessive honeycomb and embedded debris is not acceptable.
- H. Conform to ACI 305R-10 when concreting in hot weather.
- I. Install vapor barrier in widest widths possible, under interior slabs on grade. Place at center of 4 inches of sand (minimum of 2 inches of sand top and bottom) lapping joints at least 18 inches and sealing joints, taping pipe penetrations.
- J. Screed slabs and concrete bases level to a tolerance of 1/8-inch in 10 feet. Vary slab thickness as required to maintain top of slab elevation as design. Maintain top of slab elevation within $\pm 3/8$ " of intended elevation. Continually survey top of concrete elevations during concrete pour.

- K. Inspect concrete surfaces immediately upon removal of forms. Patch imperfections.
- L. Modify or replace concrete not conforming to required lines, details, shapes and elevations. Do not patch, fill, touch-up, repair, or replace exposed architectural concrete except upon express direction of Architect.
- M. Provide smooth rubbed finish on concrete surfaces to be left exposed such as concrete walls, columns, beams, and joists, except as otherwise indicated.
- N. Beginning immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete. Moisture cure for seven (7) days minimum all interior slabs.
- O. Drypack shall be packed solid under baseplates and thoroughly packed under pressure treated mudsills, per Structural Details, so as to obtain a continuous bearing.

3.06 CONSTRUCTION JOINTS

- A. Provide construction joints in slabs in accordance with ACI 318.
 - 1. For slabs-on-grade, place control joints at 15 feet maximum on center in each direction, unless shown otherwise on Drawings.
- B. The surface of horizontal construction joints shall be cleaned and roughened by removing the entire surface and exposing clean aggregate solidly embedded in mortar matrix, in accordance with the following procedure:

The contact surface shall be thoroughly cleaned by chipping or sand-blasting the entire surface not earlier than 5 days after initial pour, or by an approved method that will assure equal bond, such as a thorough hose-washing of the surface not less than two or more than four hours after the concrete is placed (depending on setting time), wash water and chalk-like material being entirely cleaned from the surface.

In the event that the contact surface becomes coated with earth, sawdust, etc. after being cleaned, the entire surface so coated shall be re-cleaned.

A mix containing the same proportion of sand and cement used in the concrete, plus a maximum of 50 percent of the coarse aggregate, shall be placed on horizontal joints before proceeding with the regular specified mix. A delay at least until the concrete in columns and walls is no longer plastic must occur before casting or erecting beams, girders, or slabs supported thereon. Beams, girders, brackets, column capitals, and haunches shall be considered as part of the floor system, and shall be placed monolithically therewith.

3.07 FIELD QUALITY CONTROL

- A. Testing: Comply with CBC, Title 24, Part 2, Section 1903A.
- B. If compressive strength tests of cylinder specimens fail to show strengths assumed in design, take 4 inch diameter cores at representative locations throughout structure as

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designated by Inspector. Take cores in accordance with ASTM C42. The strength level of the concrete shall be considered satisfactory if the average strengths of the area or panel equals or exceed the specified strength at 28 days, with no individual strength test of such area or panel less than 5 percent below that specified. Concrete that does not meet or exceed these criteria shall be removed by the contractor and replaced with concrete that conforms to these criteria. Remove and replace defective concrete at no additional cost to Owner. Be financially responsible for repair and replacement of other in-place materials affected by such removal and replacement.

Costs of taking core samples and performing tests required will be paid by Owner if tests prove satisfactory. If test fail to show required strengths, concrete contractor will be held financially responsible.

- C. If the strength of the molded test cylinder falls below the minimum ultimate compressive strength assumed in the design, adjust the proportions of the mix for the remaining portion of the structure to give concrete of the assumed minimum strength.
- D. Concrete will also be deemed defective which is not formed properly as indicated, is not true to intended alignment, is not plumb or level where so intended, is not true to intended grades, has sawdust or other debris embedded within it, or does not fully conform to other provisions of these specifications. As directed, remove and replace with concrete complying with these specifications.

3.08 CONCRETE FINISHES

- A. **Slab Levels:** Surfaces shall finish true to 1/8-inch in 10 feet on a straight-edge and in direction with maximum high and low variance occurring in not less than 20 feet and with 1/16-inch maximum tolerance in one running foot. Particular care shall be taken to finish troweling around the edges of the slabs so finish surface edges shall be at same elevations as the rest of the top surface of the slab. Slabs shall be surveyed continuously during pour.
- B. **Concrete Sealer:** Concrete floors not indicated in the schedule to receive other finish shall receive two coats of sealer specified this section. Concrete to receive sealer shall be cured with specified concrete sealer that functions also as cure. Use the same material for each application.
- C. **Steel Trowel Finish:** Interior slabs shall receive a monolithic steel trowel finish. Surfaces shall be screeded, wood floated, and steel-troweled. Finish shall be a smooth, hard, dense, impervious surface, free of defects. Finishers shall work from knee boards laid flat upon the surface. Mechanical troweling machines may be used if the desired finish and level tolerances can be obtained by their use, but finishing shall be by hand troweling.
 - 1. Slabs to receive tile, carpet or adhered finishes shall receive light/medium broom finish to create "tooth" for adhesive.
 - 2. Unfinished exposed to view slabs in service closets, mechanical, electrical, stairs, ramps, and similar spaces shall receive a medium/heavy broom finish. See Section 32 16 00 for site flatwork.
- D. Depressed slabs shall be finished by tamping slab with an open grid tamper, screeding with a straightedge and wood floating to a true and uniform surface, true to tolerance of 1/4-inches in 10 feet.

3.09 CONCRETE CURING AND PROTECTION

- A. General: At slabs that do not receive concrete sealer, per 2.01D, provide the following: Concrete Curing per Section 5.11, ACI 318. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Concrete shall be maintained above 50 degrees and continuously moist for not less than 7 days.

Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

- B. Slab Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover during, and by combinations thereof, as herein specified. Provide Moisture-Curing by the following Methods:
1. Keep concrete surface continuously wet by covering with water. Continuous water-fog spray, for seven (7) days minimum.
 2. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof type of adhesive. Immediately repair holes or tears during curing period using cover material and waterproof tape, for seven (7) days minimum.
 3. Provide Curing and Sealing Compound to exterior slabs, walks, and curbs, as follows:
 - a. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Re-coat areas subjected to heavy rainfall within 3 hours after initial application.
 - b. Maintain continuity of coating and repair damage during curing period.
 - c. **Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, such as liquid floor hardener, waterproofing, damp proofing, membrane roofing, ceramic or quarry tile, vinyl composition tile (VCT), glue-down carpet, painting, and other coatings and finish materials, unless otherwise acceptable to Architect.**
 - d. Cure formed concrete surfaces, including undersides of beams, supported slabs, and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
 4. Curing Unformed Surfaces:
 - a. Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of moisture curing method.

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- b. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.
- 5. Sealer and Dustproofer: Apply two (2) coats of specified curing and sealing compound to Interior slab surfaces not receiving any other finish.
- 6. Concrete (other than high-early-strength) shall be maintained above 50 degrees F. and in a moist condition for at least the first seven (7) days after placement, except when cured in accordance with Section 5.11, ACI 318.

3.10 PROTECTION

- A. Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.
- B. Exposed Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
 - 1. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.
 - 2. Grout base plates and foundations as indicated, using specified non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.
 - 3. Steel Pan Stairs: Provide concrete fill for steel pan stair treads and landings and associated items. Cast-in safety inserts and accessories as shown on drawings. Screed, tamp, and finish concrete surfaces as scheduled.
- C. Concrete Surface Repairs: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect.
 - 1. Cut out honeycomb, rock pockets, voids over 1/4 inch in dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.
 - 2. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- D. Repair of Formed Surfaces:
 - 1. Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface, and stains and other discolorations that cannot

be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

2. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- E. Repair of Unformed Surfaces:
1. Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.
 2. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01-inch wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
 3. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
 4. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.
 5. Site walls: Remove cracked, honeycombed or defective concrete as required by the Architect from joint to joint. Patching, calking, filling or repairing will not be permitted.
- F. Repair Defective Areas:
1. Repair defective areas, except random cracks and single holes not exceeding 1 inch diameter, by cutting-out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4 inch clearance around.
 2. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 3. Repair isolated random cracks and single holes not over 1 inch in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

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4. Site walls: Remove cracked, honeycombed or defective concrete as required by the Architect from joint to joint. Patching, calking, filling or repairing will not be permitted
 5. Perform structural repairs with prior approval of Architect of Structural Engineer for method and procedure, using specified epoxy adhesive and pressure grouting.
 6. Repair method not specified above may be used, subject to acceptance of Architect.
- G. Mitigation of Unacceptable High Moisture Emission Levels: Interior slabs-on-grade tested at levels in excess of 5.0 lbs/1000 s.f. shall be further evaluated with additional calcium chloride tests. Once levels are established, additional preparation measures shall be employed (depending on the magnitude of moisture levels) using one or both of the following products:
- 2 coats of Super-Krete
 - 2 coats of Rust-Oleum 6000 system.

END OF SECTION

10 00 00

SPECIALTIES

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SECTION 10 14 00

SIGNAGE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Site signs, room identification (door) signs, and code-required informational signs, except electrical light exit signs.
- B. Related Work Not Included: Electrical light exit signs.

1.02 SUBMITTALS

- A. Provide all submittals in accordance with the requirements of Section 01 33 00.
- B. Product Data: Submit manufacturer's technical data related to materials, component dimensions, profiles, finishes, and installation.
- C. Shop Drawings: Submit shop drawings for fabrication and erection of site signs. Show anchors, grounds, reinforcement, accessories, layout, and installation details.
 - 1. Submit full-scale layout for each sign larger than 48 inches in any dimension required for review of wording, spacing, and letter design.
- D. Samples: Submit sample of each product and material indicating color, finish, pattern, and texture.
 - 1. Submit samples of each color and finish of exposed materials and accessories required for specialty signs.
 - 2. Submit one full-size sample sign of type, style, and color specified, including method of attachment. If accepted, sample will become part of the job.

1.03 QUALITY ASSURANCE

- A. In addition to complying with pertinent codes and regulations, comply with industry and trade standards normally associated with this product or material.
- B. Design Data: Design, fabricate, and install exterior signs to withstand a wind pressure of 100 mph on the total sign area in all directions.
- C. Mock-up: Construct full-size mock-up, in medium of supplier's choice, of school site sign for approval.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Protect signs components and surfaces against damage during transportation and unloading.

1.05 WARRANTY

- A. Provide written warranty to maintain, repair and replace products and materials for one year following Notice of Completion date, without additional cost to Owner, as specified in

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Section 01 78 30 – Warranties, Guarantees, and Bonds. Provide 20-year life expectancy for legibility, color retention and resistance to climatic elements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Provide products from Best Sign Systems - 1-800-235-2378, or ASI Sign Systems - 800-247-7732, or equal.

2.02 MATERIALS

- A. All signage shall conform to CBC, 2019, Title 24, Part 2, Sections 11B-603.2.3, 11B-604.8.1.2, and 11B-703. Tactile exit signage shall be provided per Section 1011.4.
- B. Fiberglass - Glass fiber reinforced thermosetting resin – 1/4-inch 2.48 lb/SF.
- C. Metal: Cast aluminum with baked enamel finish. Engraved areas shall be filled with contrasting color paint. Use only where existing signage is metal.
- D. Character and Letters:
1. Character Type: Characters on signs shall be raised 1/32-inch (0.794 mm) minimum and shall be Sans Serif uppercase characters accompanied by California Contracted Grade 2 Braille, see Braille symbols paragraph 2.02D.5.
 2. Character Size: Raised characters shall be a minimum of 5/8-inch (15.9mm) and a maximum of 2 inches (51 mm) high.
 3. Finish and Contrast: Contrast between characters, symbols and their background shall be non-glare finish. Characters and symbols shall contrast with background, either light on a dark background or dark on a light background, per CBC, Title 24, Part 2, Section 11B-703.5.1, Section 11B-703.6.2, and Section 11B-703.7.1.
 4. Proportions: Visual characters on signs shall be selected from fonts where the width of the uppercase letters "O" is 60 percent minimum and 110 percent maximum of the height of the uppercase letter "I". Stroke thickness of the uppercase letter "I" shall be 10 percent minimum and 20 percent maximum of the height of the character, per CBC 2019, Title 24, Part 2, Sections 11B-703.2.4, 11B-703.2.6, 11B-703.5.4, and 11B-703.7.

All letters measured must be uppercase. After choosing a type style to test, begin by printing the letters, I, X and O at 1-inch height. Place the template's 1:1 square over the X or O, whichever is narrower. If the character is not wider than 1 inch, nor narrower than the 3:5 rectangle, the proportions are correct. Use the 1:5 rectangle to determine if the stroke of the I is too broad, and the 1:10 rectangle to see if it is too narrow. If all the tests are passed, the type style is compliant with proportion codes.

5. Braille Symbols: California Contracted Grade 2 Braille shall be used wherever Braille is required in other portions of these standards and per CBC 2019, Title 24, Part 2, Sections 11B-703.3, 11B-703.3.1, and 11B-703.3.2.

2.03 SIGNS

- A. Exterior Room Identification Signs: Equal to Best Sign Systems FG, Graphic Blast®, Format: borderless. Color as selected by Architect from manufacturer's standard colors. Color to contrast building background. Sign material 1/4-inch thick, non-glare, Fiberglass, 9" x 9" (unless detailed otherwise) with 1/2-inch radius rounded corners and beveled edges. Tactile character/symbols shall be raised 1/32-inch from sign face.

All text shall be accompanied by California Contracted (Grade 2) Braille. Provide one (1) sign per exterior door. Each sign to bear a room number and up to 16 letter text.

Unless shown otherwise on the Drawings, room number shall be 2 inches high, text shall be 1 inch high. Letter styles shall be Helvetica, medium. Signs shall comply with CBC 2019, Title 24, Part 2, Sections 11B-216 and 11B-703.

- B. Interior Room Identification Signs: Equal to Best Sign Systems FG, Graphic Blast®, Format- as specified in drawings. Color as selected by Architect from manufacturer's standard colors. Color to contrast building background. Sign material 1/8-inch, non-glare, phenolic ES plastic laminate, X" x X" with 1/2-inch radius rounded corners and beveled edges.

Tactile character/symbols shall be raised 1/32-inch from sign face. All text shall be accompanied by California Contracted Grade 2 Braille.

Provide one sign per interior door. Each sign to bear a room number and up to a 16-letter text. Unless shown otherwise on the Drawings, room number shall be 2 inches high, text shall be 3/4- inch high. Letter styles shall be Helvetica, medium. Signs shall comply with CBC 2016, Title 24, Part 2, Sections 11B-216 and 11B-703.

- C. "Fire Sprinkler Valve Inside" Signs: Equal to Best Sign Systems, Graphic Blast®, 1/4-inch thick Fiberglass, X inches square. Provide one (1) for each fire sprinkler valve located at entrance to space where fire sprinkler valve is located.

- D. Toilet Room Signs: Equal to Best Sign System FG, Graphic Blast®. Provide 1/4-inch thick, non-glare fiberglass with International symbols for WOMEN and MEN and RESTROOM. Locate 5'-0" above floor to center line of sign. (No Braille or raised Pictograms on door signs.) Sign color to contrast 70% with door leaf.

1. For men provide a door-mounted 12-inch equilateral triangular sign per CBC, Title 24, Part 2, Section 11B-703.7.2.6.1.
2. For women provide a door-mounted 12-inch diameter circular sign per CBC, Title 24, Part 2, Section 11B-703.7.2.6.2.
3. For unisex toilets, provide a door-mounted sign consisting of a circle 1/4-inch thick and 12 inches in diameter with a 1/4-inch thick triangle, 12 inches in diameter, with a vertex pointing upward, superimposed on the circle. Triangle shall contrast in color with circle, and circle shall contrast 70% with door leaf. Entire background color of geometric symbol sign must contrast with door. Sign shall comply with CBC, Title 24, Part 2, Section 11B-703.7.2.6.3.
4. At toilets equipped for the physically disabled, provide a wall mounted Best Sign Systems, size 8"x8" with 1/2 radius corners (as detailed on the Drawings) with a 4-inch male/female pictogram and International Symbol of Accessibility pictogram, and California Contracted Grade 2 Braille.

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D. Site Signs

1. Equal to Nelson-Harkins ES200 Series: Baked enamel finish with silk screen copy and Helvetica medium letter style. Single post and double post construction where indicated on the Drawings. 2"x 2" posts (post design 'A') enclosed with a .090 aluminum double panel background. Where shown on the Drawings, provide Nelson-Harkins RS 250 Series Regulatory Signs with square corners, silk screen copy, and post 2" x 2" Design 'A', mounting PM. If bottom of sign is less than 80 inches above finish grade, edges of sign shall be rounded, minimum radius of 1/8-inch.

OR

1. Equal to Stop Signs and More, Carlsbad, CA., Phone (888) 931-1793. Parking stall signs shall be heavy gauge aluminum .063 gauge for parking, direction, and information. and .080 for stop signs with 3M Engineer Grade Reflective sheeting and 3M inks. Corners shall be rounded minimum 1/2-inch. Posts shall be square tube 2-inch x 2-inch .062 wall thickness extruded aluminum tube.
- E. Entrance Signs: All building entrances that are accessible to and usable by physically disabled persons shall be identified with at least one (1) Accessible to persons with disabilities sign, equal to Best Sign Systems FG, Graphic Blast®, 1/4" – Fiberglass. Provide a 9-inch square with the International Symbol of Accessibility (ISA) on doors or adjacent glass indicated in the Door Schedule.
- F. Metal Letters for School Sign: By Matthews Bronze, (888) 838-8890. School sign shall be cast aluminum alloy C443.2, baked enamel, medium bronze color, Helvetica medium, all caps, X inches high letters, 3/8-inches deep, flush concealed mounting. Copy to be verified with Owner prior to ordering.
- G. Occupancy Load Sign: Size as indicated on Drawings to match sign per paragraph 2.03B above, reading: "MAXIMUM OCCUPANCY 000 PERSONS", Verify occupant number with Drawings.
- H. Building Signs: Building signs shall be cast aluminum letters XX" high and set off the face of the wall.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Locate signs where indicated on Drawings, and at heights as detailed, or where required by CBC, Title 24, using mounting methods appropriate to application and in compliance with manufacturer's instructions.
- B. Install signs level, plumb, and at required height.
- C. Interior Wall and Door Mounted Signs:
1. Glass Surfaces or Doors: Use double-sided foam tape and liquid silicone adhesive. At glass surfaces, provide a blank 9" x 9", 1/8-inch sign panel with 1/2-radius corners, at the opposite side of glass. Color to match sign panel.
 2. Irregular, Porous, or Vinyl-Covered Surfaces: Use one-way tamper proof screws, painted to match signs, in pre-drilled holes. Provide adequate spaces behind signs so signs are in a plumb, square, level plane.

3. Brick, Masonry, and Concrete Surfaces: Use one-way tamperproof screws, painted to match signs, in pre-drilled holes. Provide adequate spaces behind signs so signs are in a plumb, square, level plane.

D. Exterior Wall and Door Mounted Signs:

1. Wood, or Plaster Surfaces: Use tamper proof screws, painted to match signs, in pre-drilled holes; one at each corner, and set in liquid silicone adhesive. Provide adequate spaces behind signs so signs are in a plumb, square, level plane.
2. Brick, Masonry, Plaster and Masonry Surfaces: Use tamper proof screws, painted to match signs, in pre-drilled holes; one at each corner, and set in liquid silicone adhesive. Provide adequate spaces behind signs so signs are in a plumb, square, level plane.

3.02 CLEANING

- A. Clean sign and surrounding surfaces to remove all dirt and debris from work of this section.

END OF SECTION

SECTION 10 28 13

TOILET ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Toilet accessories including attachment devices and required rough-in frames as indicated on the Drawings and specified herein.
- B. Related Work:
 - 1. Blocking and unframed mirrors.

1.02 SUBMITTALS

- A. Samples: Submit one sample, if requested, of each item and model specified. If approved sample may be incorporated into project.
- B. Manufacturer's catalog and data sheets, parts list, and installation requirements for each unit specified.
- C. Maintenance, operation instructions and keys required for each type of equipment and lock.

1.03 QUALITY ASSURANCE

- A. Manufacturers: Model numbers are for washroom accessories manufactured by Bobrick Washroom Equipment, Inc. and are listed as a standard of quality. Equivalent products of other manufacturers may be acceptable, if, in the judgment of the architect, they meet the intent of the specification in terms of design, function, materials, and quality of workmanship. Products by other manufacturers may be provided, if approved equal by Architect.
- B. Accessories shall be products of a single manufacturer. Keyed (tumbler lock) accessories shall be keyed alike with the exception of coin receiving boxes on vending equipment.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver items in manufacturer's original unopened protective packaging.
- B. Store material in original protective packaging to prevent soiling, physical damage, or wetting.
- C. Handle so as to prevent damage to finished surfaces.
- D. Maintain protective covers on units until installation is complete. Remove covers at final clean-up of installation.

1.05 GUARANTEE

- A. Mirrors guaranteed 15 years against silver spoilage. Accessories guaranteed to be free from defects in workmanship and material for a period of one year, as specified in Section 01 78 30 – Warranties, Guarantees, and Bonds.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Contract documents are based on Bobrick Washroom Equipment, Inc., and are listed as a standard of quality. Products by other manufacturers may be acceptable if approved equal by Architect in terms of design, function, materials and quality of workmanship.
- B. Accessories shall be product of one manufacturer. Keyed accessories shall be keyed alike with exception of coin receiving boxes on vending equipment. Provide recessed accessories at all accessible compartments.
- C. Toilet Accessories required to be accessible shall be mounted at heights according to CBC, Title 24, Part 2, Section 11B-213.
- D. Dispensing controls must be accessible without pinching, grasping, or twisting of the wrist, per CBC, Title 24, Part 2, Section 11B-309.4

2.02 REFERENCES

- A. Toilet Accessories required to be accessible shall be mounted at heights according to CBC, Title 24, Part 2, Section 11B-213
 - 1. Toilet paper and feminine napkin disposal located on the grab bar side of an accessible toilet room or stall shall not project more than 3 inches from the finish wall surface nor be located closer than 1-1/2-inch clear of the tangent point of the grab bar.
 - 2. Toilet tissue dispensers to be continuous flow type, CBC, Title 24, Part 2, Section 11B-604.7.
 - 3. Toilet paper dispenser in accessible toilet compartment to be recessed, or semi-recessed so as not to project more than 3 inches (76.2 mm) from face of wall.
- B. *Grab Bars (CBC, Title 24, Part 2, Section 11B-213.3, 11B-604.5, and 11B-609)*
 - 1. Length for rear and side walls:
 - a. 36 inches (914 mm) min. for rear wall, per Section 11B-604.5.2
 - b. 42 inches (1,067 mm) min. for side wall, per Section 11B-604.5.1
 - 2. Maximum and minimum diameters:
 - a. 1 1/4 - 1 1/2 inches (32-38 mm) diameter or equivalent gripping surface
 - b. 1 1/2 inches (38 mm) min. clearance between grab bar and wall.
- C. Following (but not limited to) operable parts (including coin slots) of table room accessories to be mounted within 40 inches (1,016 mm) max above finish floor per CBC 2019, Title 24, Part 2, Section 11B-603.5:
 - 1. Towel dispensers
 - 2. Sanitary napkin dispenser/receptacles

3. Waste receptacles
4. Other similar dispensing and disposal fixtures
5. Bottom of reflective surface of mirrors to be 40 inches (1,0616 mm) maximum above finish floors per CBC, Title 24, Part 2, Section 11B-603.3

2.03 ACCESSORIES

- A. Recessed Toilet Tissue Dispenser: Bobrick B-3888
- B. Surface Mounted Soap Dispenser: B-2111
- C. Recessed Electric Hand Dryer: World Dryer, SLIMdri, single phase 120V, color coated white, surface mounted not to exceed 4" from face of wall.
- D. Stainless Steel Welded Frame Mirror: B-165
One-piece channel frame, 1/2" x 1/2" x 3/8" type 430 stainless steel with bright-polished finish and mitered corners. Phillips-head frame screw. No. 1 quality 1/4" glass mirror. See Specifications section 08 83 00 for mirror. Mirror corners and back protected by shock-absorbing material. Back is galvanized steel secured to conceal wall hanger with theft resistant locking device.
- E. Frameless Stainless-Steel Mirrors: B-1556
- F. Recessed Napkin Dispenser: B-3706 25
- G. Surface Mounted Sanitary Napkin Disposal: B-2706 50
- H. Recessed Toilet Seat Cover Dispenser: B-301, Surfaced mounted B-221

Constructed of type 304 Stainless Steel, welded construction. Door shall be equipped with full-length piano hinge and tumbler lock.
- I. Stainless Steel Shelf: B-298
Constructed of type 304 Stainless steel. Mounting brackets welded to shelf shall be 16-gauge stainless steel. Shelf shall be 8 inches wide with 3/4-inch return edges. Front edge shall be hemmed for safety.
- J. Surface Mounted Paper Towel Dispenser: B-2620
- K. Shower Bench: B-5181

Folding shower seat shall be constructed of type 304 stainless steel. Seat shall be 1/2" thick, solid phenolic with integral slots for water drainage.
- L. Grab Bars:
 1. 1-1/2 inches diameter, 48 inches length: B-6806x48
 2. Same as (1.) above, 36 inches length: B-6806x36
 3. Two-wall Shower Grab Bar: B-68616.99

Flanges shall be 1/8" thick stainless-steel plate and each shall have two screw holes for attachment to wall. Flange covers shall be 22-gauge stainless steel

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and snap over mounting flange to conceal screws.

M. Mop Rack: B-223x36

Constructed of type 304 Stainless Steel, 36 inches in length, and have spring loaded rubber cam holders.

N. Recessed Paper Towel Dispenser and Trash Receptacle Combination: B-43944.

PART 3 - EXECUTION

3.01 INSPECTION

A. Check wall opening for correct dimensions, plumbness of blocking, or frames, and other preparation that would affect installation of accessories.

3.02 INSTALLATION

A. Install manufacturers recommended anchor system for grab bars.

B. Refer to Drawing details for mounting heights.

C. Conceal evidence of drilling, cutting, and fitting on adjacent finishes.

D. Fit flanges of accessories snug to wall surfaces. Provide for caulking in gaps between 90-degree return flanges and finish wall surface after accessories are installed.

3.03 ADJUSTING

A. Adjust accessories for proper operation.

3.04 CLEANING

A. Clean and polish exposed surfaces prior to final inspection.

3.05 PROTECTION

A. Deliver accessory schedule, keys and parts manual as part of project-closeout documents. For Owner's permanent records, provide two sets of the following items of manufacturer's literature:

1. Technical Data sheets of each item used for the project.
2. Service and Parts Manuals.
3. Name of local representative to be contacted in the event of need of field service or consultation.

END OF SECTION

26 00 00

ELECTRICAL

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SECTION 26 01 00

ELECTRICAL GENERAL PROVISIONS

ARTICLE 1 SUMMARY

- 1.1 This Division of the specification outlines the provisions of the contract work to be performed under this Division.
- 1.2 This Section applies to and forms a part of each section of specifications in Division 26 and all work performed under Division 26, 27 and 28.
- 1.3 In addition, work in this Division is governed by the provisions of the bidding requirements, contract forms, general conditions and all sections under general requirements.
- 1.4 These specifications contain statements which may be more definitive or more restrictive than those contained in the General Conditions. Where these statements occur, they shall take precedence over the General Conditions.
- 1.5 Where the words 'provide' or 'provision' are used, it shall be definitely interpreted as 'furnishing and installing complete in operating condition'. Where the words 'as indicated' or 'as shown' are used, it shall mean as shown on contract drawings.
- 1.6 Where items are specified in the singular, this Division shall provide the quantity as shown on drawings plus any spares or extras mentioned on drawings or specifications. All specified and supplied equipment shall be new.

ARTICLE 2 CONTRACTOR QUALIFICATIONS

- 2.1 The Contractor shall have a current California C-10 Electrical Contractor's license and all individuals working on this project shall have passed the Department of Industrial Relations Division of apprenticeship Standards – "Electrician Certification Program."

ARTICLE 3 CODES, PERMITS AND FEES

- 3.1 Comply with all applicable laws, ordinances, rules, regulations, codes, or rulings of governmental units having jurisdiction as well as standards of NFPA and serving utility requirements.
- 3.2 Obtain permits, fees, inspections, meter and the like, associated with work in each section of this Division.
- 3.3 Installation procedures, methods and conditions shall comply with the latest requirements of the Federal Occupational Safety and Health Act (OSHA).

ARTICLE 4 EXAMINATION OF PREMISES

- 4.1 Examine the construction drawings and premises prior to bidding. No allowances will be made for not being knowledgeable of existing conditions.

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ARTICLE 5 STANDARDS

- 5.1 The following standard publications of the latest editions enforced, and supplements thereto shall form a part of these specifications. All electrical work must, as a minimum, be in accordance with these standards.
- 5.1.1 2016 California Electrical Code (CEC), Part 3 Title 24 CCR.
 - 5.1.2 National Fire Protection Association.
 - 5.1.3 Underwriters' Laboratories, Inc. (UL).
 - 5.1.4 Certified Ballast Manufacturers' Association (CBM).
 - 5.1.5 National Electrical Manufacturers' Association (NEMA).
 - 5.1.6 Institution of Electrical & Electronics Engineers (IEEE).
 - 5.1.7 American Society for Testing & Materials (ASTM).
 - 5.1.8 National Board of Fire Underwriters (NBFU).
 - 5.1.9 National Board of Standards (NBS).
 - 5.1.10 American National Standards Institute (ANSI).
 - 5.1.11 Insulated Power Cable Engineers Association (IPECS).
 - 5.1.12 Electrical Testing Laboratories (ETL).
 - 5.1.13 National Electrical Safety Code (NESC).
 - 5.1.14 2016 California Building Code (CBC), Part 2, Title 24 CCR.
 - 5.1.15 2016 California Fire Code (CFC), Part 9, Title 24, CCR.
 - 5.1.16 2016 NFPA 72 with California State Amendments
 - 5.1.17 National Electrical Testing Association (NETA), 2010 or most current

ARTICLE 6 DEFINITIONS

- 6.1 Concealed: Hidden from sight, as in trenches, chases, hollow construction, or above furred spaces, hung ceilings - acoustical or plastic type, or exposed to view only in tunnels, attics, shafts, crawl spaces, unfinished spaces, or other areas solely for maintenance and repair.
- 6.2 Exposed, Non-Concealed, Unfinished Space: A room or space that is ordinarily accessible only to building maintenance personnel, a room noted on the 'finish schedule' with exposed and unpainted construction for walls, floors, or ceilings or specifically mentioned as 'unfinished'.
- 6.3 Finish Space: Any space ordinarily visible, including exterior areas.

ARTICLE 7 WORK AND MATERIALS

- 7.1 Unless otherwise specified, all materials must be new and of the best quality. Materials previously incorporated into other projects, salvaged, or refurbished are not considered new. Perform all labor in a thorough and workmanlike manner.
- 7.2 All materials provided under the contract must bear the UL label where normally available. Note that this requirement may be repeated under equipment specifications. In general, such devices as will void the label should be provided in separate enclosures and wired to the labeled unit in proper manner.

ARTICLE 8 SHOP DRAWINGS AND SUBMITTALS

- 8.1 Submit shop drawings and all data in accordance with Division 1 of these specifications and as noted below for all equipment provided under this Division.
- 8.2 Shop drawings submittals demonstrate to the Architect that the Contractor understands the design concept. The Contractor demonstrates their understanding by indicating

which equipment and material they intend to furnish and install and by detailing the fabrication and installation methods of material and equipment he intends to use. If deviations, discrepancies, or conflicts between submittals and specifications are discovered either prior to or after submittals are processed, notify the Architect immediately.

- 8.3 Manufacturer's data and dimension sheets shall be submitted giving all pertinent physical and engineering data including weights, cross sections and maintenance instructions. Standard items of equipment such as receptacles, switches, plates, etc., which are cataloged items, shall be listed by manufacturer.
- 8.4 Index all submittals and reference them to these specifications. All submittal items shall be assembled and submitted, one for each specification section. (Multiple specification sections may be grouped together in one common submittal binder, as long as each individual section is clearly identified.) Partial or incomplete submittal sections will not be reviewed.

ARTICLE 9 EQUIPMENT PURCHASES

- 9.1 Arrange for purchase and delivery of all materials and equipment within 20 days after approval of submittals. All materials and equipment must be ordered in ample quantities for delivery at the proper time. If items are not on the project in time to expedite completion, the Owner may purchase said equipment and materials and deduct the cost from the contract sum.
- 9.2 Provide all materials of similar class or service by one manufacturer.

ARTICLE 10 COOPERATIVE WORK

- 10.1 Correct without charge any work requiring alteration due to lack of proper supervision or failure to make proper provision in time. Correct without charge any damage to adjacent work caused by the alteration.
- 10.2 Cooperative work includes: General supervision and responsibility for proper location and size of work related to this Division, but provided under the other sections of these specifications, and installation of sleeves, inserts, and anchor bolts for work under each section in this Division.

ARTICLE 11 VERIFICATION OF DIMENSIONS

- 11.1 Scaled and figured dimensions are approximate only. Before proceeding with work, carefully check and verify dimensions, etc., and be responsible for properly fitting equipment and materials together and to the structure in spaces provided.
- 11.2 Drawings are essentially diagrammatic, and many offsets, bends, pull boxes, special fittings, and exact locations are not indicated. Carefully study drawings and premises in order to determine best methods, exact location, routes, building obstructions, etc. and install apparatus and equipment in manner and locations to avoid obstructions, preserve headroom, keep openings and passageways clear, and maintain proper clearances.

ARTICLE 12 CLOSING-IN OF UNINSPECTED WORK

- 12.1 Cover no work until inspected, tested, and approved by the Architect. Where work is covered before inspection and test, uncover it and when inspected, tested, and approved, restore all work to original proper condition at no additional cost to Owner.

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ARTICLE 13 EXCAVATION AND BACKFILL

- 13.1 All excavation and backfill shall be in accordance with Division 1 of these specifications and as noted below.
- 13.2 Perform all necessary excavation, shoring, and backfilling required for the proper laying of all conduits inside the building and premises, and outside as may be necessary.
- 13.3 Excavate all trenches open cut, keep trench banks as nearly vertical as practicable, and sheet and brace trenches where required for stability and safety. Excavate trenches true to line and make bottoms no wider than necessary to provide ample work room. Grade trench bottoms accurately. Machine grade only to the top line of the conduits, doing the remainder by hand. Do not cut any trench near or under footings without first consulting the Architect. All trenches shall be done in accordance with OSHA standards and regulations.
- 13.4 Backfilling shall be done with each layer compacted before another layer is added. No stones or coarse lumps shall be laid directly on a conduit or conduits.
- 13.5 Trenches shall be filled with the specified material. Sod, if any, shall be removed in cut sections and replaced in same manners.
- 13.6 Provide pumps and drainage of all open trenches for purposes of installing electrical duct and wiring.
- 13.7 Perform all backfilling in accordance with the requirements of and under the direction of the Geotechnical Engineer.
- 13.8 Where new underground trenching is required on sites or in any area where existing underground utilities exist, the Contractor shall provide an independent professional utility locating service to locate exact vertical and horizontal locations of all existing utilities. Where existing utilities are found the Contractor shall hand dig those areas to avoid disruption. The Contractor shall be responsible for immediate repairs to existing underground utilities damaged during construction. The Contractor shall repair all existing asphalt, concrete and landscape surfaces damaged or removed during construction to match their original conditions. Where trenching extends through public streets or roadways, the Contractor shall notify underground service alert in addition to the independent locating service 48 hours before start of construction to determine location of existing utilities by calling (800) 422-4133.

ARTICLE 14 CONCRETE

- 14.1 Where used for structures to be provided under the contract such as bases, etc., concrete work, and associated reinforcing shall be as specified under Division 3 of these specifications.
- 14.2 See other sections for additional requirements for underground vaults, cable ducts, etc.

ARTICLE 15 ACCESSIBILITY

- 15.1 Install all control devices or other specialties requiring reading, adjustment, inspection, repairs, removal, or replacement conveniently and accessibly throughout the finished building.

- 15.2 All required access doors or panels in walls and ceilings are to be furnished and installed as part of the work under this Section. Refer to Division 1 of these specifications and as noted below.
- 15.3 Where located in fire rated assemblies, provide doors which match the rating of the assembly and are approved by the jurisdictional authority.
- 15.4 Refer to 'finish schedule' for types of walls and ceilings in each area and the architectural drawings for rated wall construction.
- 15.5 Coordinate work of the various sections to locate specialties requiring accessibility with others to avoid unnecessary duplication of access doors.

ARTICLE 16 FLASHING

- 16.1 Flash and counter flash all conduits penetrating roofing membrane as shown on Architectural drawings. All work shall be in accordance with Division 7 of these specifications.

ARTICLE 17 IDENTIFICATION OF EQUIPMENT

- 17.1 All electrical equipment shall be labeled, tagged, stamped, or otherwise identified in accordance with the following schedules:

17.1.1 General:

- 17.1.1.1 In general, the installed laminated nameplates as hereinafter called for shall also clearly indicate its use, areas served, circuit identification, voltage and any other useful data.

- 17.1.1.2 All auxiliary systems, including communications, shall be labeled to indicate function.

17.1.2 Lighting and Local Panelboards:

- 17.1.2.1 Panel identification shall be with white and black micarta nameplates. Letters shall be no less than 3/8" high.

- 17.1.2.2 Circuit directory shall be two column typewritten card set under glass or glass equivalent. Each circuit shall be identified by the room number and/or number of unit and other pertinent data as required.

17.1.3 Distribution Switchboards and Feeders Sections:

- 17.1.3.1 Identification shall be with 1" x 4" laminated white micarta nameplates with black lettering on each major component, each with name and/or number of unit and other pertinent data as required. Letters shall be no less than 3/8" high.

- 17.1.3.2 Circuit breakers and switches shall be identified by number and name with 3/8" x 1-1/2" laminated micarta nameplates with 3/16" high letters mounted adjacent to or on circuit breaker or switch.

17.1.4 Disconnect Switches, Motor Starters and Transformers:

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17.1.4.1 Identification shall be with white micarta laminated labels and 3/8" high black lettering.

17.1.5 All communication system terminal boxes including T.V., telephone/intercom, security, fire alarm, clock, and computer networking shall be provided with white micarta laminated labels and 3/8" high black lettering.

ARTICLE 18 CONSTRUCTION FACILITIES

18.1 Furnish and maintain from the beginning to the completion all lawful and necessary guards, railings, fences, canopies, lights, warning signs, etc. Take all necessary precautions required by City, State Laws, and OSHA to avoid injury or damage to any persons and property.

18.2 Temporary power and lighting for construction purposes shall be provided under this Section. All work shall be in accordance with Division 1 of these specifications.

ARTICLE 19 GUARANTEE

19.1 Guarantee all material, equipment and workmanship for all sections under this Division in writing to be free from defect of material and workmanship for one year from date of final acceptance, as outlined in the general conditions. Replace without charge any material or equipment proven defective during this period. The guarantee shall include performance of equipment under all site conditions, conditions of load, installing any additional items of control and/or protective devices, as required.

ARTICLE 20 PATENTS

20.1 Refer to the General Conditions for Contractor's responsibilities regarding patents.

ARTICLE 21 PLUMBING (DIVISION 22) / HEATING, VENTILATING, AND AIR CONDITIONING (DIVISION 23) / ELECTRICAL – COORDINATION REQUIREMENTS

21.1 All electrical work performed for this project shall conform to the California Electrical Code, to Local Building Codes and in conformance with Division 22, 23, and 26 of these specifications, whether the work is provided under the "Plumbing", "Heating, Ventilating, and Air Conditioning", or the "Electrical" Division of these specifications. Where the Division 22 and/or Division 23 Contractor is required to provide electrical work, he shall arrange for the work to be done by a licensed Division 26 Contractor, using qualified electricians. The Division 22 and/or Division 23 Contractor shall be solely and completely responsible for the correct functioning of all equipment regardless of who provided the electrical work.

21.2 The work under Division 22 and/or Division 23 shall include the following:

21.2.1 All motors required by mechanical equipment.

21.2.2 All starters for mechanical equipment which are not provided under the electrical division as part of a motor control center or otherwise indicated on the electrical drawings.

21.2.3 All wiring interior to packaged equipment furnished as an integral part of the equipment.

21.2.4 All control **wiring and conduit** for mechanical control systems.

- 21.2.5 All control systems required by mechanical equipment.
- 21.3 The work under Division 26 shall include the following:
- 21.3.1 All power wiring and conduit; and conduit only for EMS control conductors between each building and the main control panel.
- 21.3.2 Electrical disconnects as shown on the electrical drawings.
- 21.3.3 Starters forming part of a motor control center.
- 21.4 All power wiring and conduit to equipment furnished under Division 22 and/or Division 23 shall be provided under Division 26. Control wiring and conduit, whether line voltage or low voltage, shall be provided under the division which furnishes the equipment.
- 21.5 Power wiring shall be defined as all wiring between the panelboard switchboard overcurrent device, motor control center starter or switch, and the safety disconnect switch or control panel serving the equipment. Also, the power wiring between safety disconnect switch and the equipment line terminals.
- 21.6 Control wiring shall be defined as all wiring, either line voltage or low voltage, required for the control and interlocking of equipment, including but not limited to wiring to motor control stations, solenoid valves, pressure switches, limit switches, flow switches, thermostats, humidistats, safety devices, smoke detectors, and other components required for the proper operation of the equipment.
- 21.7 All motor starters which are not part of motor control centers and which are required for equipment furnished under this Division shall be furnished and installed by the Division furnishing the equipment and power wiring connected under Division 26. Motor starters and control devices in motor control centers shall be furnished and installed under Division 26.
- 21.8 Division 26 Contractor shall make all final connections of power wiring to equipment furnished under this Division.
- 21.9 Wiring diagrams complete with all connection details shall be furnished under each respective Section.
- 21.10 Motor starters supplied by Plumbing and/or Heating, Ventilating and Air Conditioning shall be fused combination type minimum NEMA Size 1, and conform to appropriate NEMA standards for the service required. Provide NEMA type 3R/12 gasketed enclosures in wet locations. Provide all starters with appropriately sized overload protection and heater strips provided in each phase, hand/off auto switches, a minimum of 2 NO and NC auxiliary contacts as required, and an integral disconnecting means. For ½ horsepower motors and below, when control requirements do not dictate the use of a starter, a manual motor starter switch with overload protection in each phase may be provided. Acceptable manufacturers are Allen Bradley, General Electric, Square D, Furnas and Cutler Hammer.

ARTICLE 22 EQUIPMENT ROUGH-IN

- 22.1 Rough-in all equipment, fixtures, etc. as designed on the drawings and as specified herein. The drawings indicate only the approximate location of rough-ins. Mounting heights of all switches, receptacles, wall mounted fixtures and such equipment must be coordinated with the Architectural Designs. The Contractor shall obtain all rough-in

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information before progressing with any work for rough-in connections. Minor changes in the contract drawings shall be anticipated and provided for under this Division of the specifications to comply with rough-in requirements.

ARTICLE 23 OWNER FURNISHED AND OTHER EQUIPMENT

- 23.1 Rough-in and make final connections to all Owner furnished equipment shown on the drawings and specified, and all equipment furnished under other sections of the specifications.

ARTICLE 24 EQUIPMENT FINAL CONNECTIONS

- 24.1 Provide all final connections for the following:
- 24.1.1 All equipment furnished under this Division.
 - 24.1.2 Electrical equipment furnished under other sections of the specification.
 - 24.1.3 Owner furnished equipment as specified under this Division.

ARTICLE 25 INSERTS, ANCHORS, AND MOUNTING SLEEVES

- 25.1 Inserts and anchors must be:
- 25.1.1 Furnished and installed for support of work under this Division.
 - 25.1.2 Mounting of equipment that is of such size as to be free standing and that equipment which cannot conveniently be located on walls, such as motor starters, etc., shall be rigidly supported on a framework of galvanized steel angle of Unistrut or B-line systems with all unfinished edges painted.
 - 25.1.3 Furnish and install all sleeves as required for the installation of all work under all Sections of this Division and for all communication systems including any communication systems described in this Section which are bid to the General Contractor. Sleeves through floors, roof, and walls shall be as described in "Conduit and Fittings" Section 26 05 33.

ARTICLE 26 SEISMIC ANCHORING

- 26.1 All switchgear and other free-standing electrical equipment or enclosures shall be anchored to the floor and braced at the top of the equipment to the structure. The Contractor shall submit drawings signed by the Contractors registered structural Engineer indicating method of compliance prior installation.
- 26.2 All sound systems, communication, signal or data networking equipment or enclosures shall be anchored to the structure. The Contractor shall submit drawings signed by the Contractors registered Structural Engineer indicating method of compliance prior to installation.

ARTICLE 27 RUST PROOFING

- 27.1 Rust proofing must be applied to all ferrous metals and shall be in accordance with Section 05500 of these specifications and as noted below.
- 27.1.1 Hot-dipped galvanized shall be applied and after forming of angle-iron, bolts, anchors, etc.

27.1.2 Hot-dipped galvanized coating shall be applied after fabrication for junction boxes and pull boxes cast in concrete.

ARTICLE 28 GENERAL WIRING

28.1 Where located adjacent in walls, outlet boxes shall not be placed back to back, nor shall extension rings be used in place of double boxes, all to limit sound transmission between rooms. Provide short horizontal nipple between adjacent outlet boxes, which shall have depth sufficient to maintain wall coverage in rear by masonry wall.

28.2 In those instances where outlet boxes, recessed terminal boxes, or recessed equipment enclosures are installed in a fire rated assembly, provide "Flamesafe FSD 1077" fire stopping pads or approved equal, over the outlet or box.

28.3 Complete rough-in requirements of all equipment to be wired under the contract are not indicated. Coordinate with respective trades furnishing equipment or with the Architect as the case may be for complete and accurate requirements to result in a neat, workmanlike installation.

ARTICLE 29 SEPARATE CONDUIT SYSTEMS

29.1 Each electrical and signal system shall be contained in a separate conduit system as shown on the drawings and as specified herein. This includes each power system, each lighting system, each signal system of whatever nature, telephone, standby system, sound system, control system, fire alarm system, etc.

29.2 Further, each item of building equipment must have its own run of power wiring. Control wiring may be included in properly sized conduit for equipment feeders of #6 AWG and smaller, having separate conduit for larger sizes.

ARTICLE 30 CLEANUP

30.1 In addition to cleanup specified under other sections, thoroughly clean all parts of the equipment. Where exposed parts are to be painted, thoroughly clean off any spattered construction materials and remove all oil and grease spots. Wipe the surface carefully and scrape out all cracks and corners.

30.2 Use steel brushes on exposed metal work to carefully remove rust, etc., and leave smooth and clean.

30.3 During the progress of the work, keep the premises clean and free of debris.

ARTICLE 31 PAINTING

31.1 Paint all unfinished metal as required in accordance with Division 1 of these specifications. (Galvanized and factory painted equipment shall be considered as having a sub-base finish.)

ARTICLE 32 GENERAL DEMOLITION REQUIREMENTS

32.1 Remove existing work and items which are required to be removed in such manner that minimum damage and disturbance is caused to adjacent and connection work scheduled to remain. Repair or replace existing work schedule.

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- 32.2 Include preparation of existing areas to receive new materials and removal of materials and equipment to alter or repair the existing building as indicated and as specified.
- 32.3 Perform demolition exercising proper care to prevent injury to the public, workmen and adjoining property.
- 32.4 Perform the removal, cutting, drilling of existing work with extreme care and use small tools in order not to jeopardize the structural integrity of the building.
- 32.5 Rebuild to existing condition or better, existing work which has to be removed to allow the installation of new work as required.
- 32.6 Remove, protect and reinstall existing items as indicated. Replace materials scheduled for reuse which are damaged by the Contractor to the extent that they cannot be reused, with equal quality material, and installation.
- 32.7 Do not reuse in this project materials and items removed from existing site or building, except with specific written approval by the Architect in each case, unless such removed material or item is specifically indicated or specified to be reused.
- 32.8 Remove materials and equipment indicated to be salvaged for reinstallation and store to prevent damage and reinstall as the work progresses. Do not reuse in this project, other materials and equipment removed from existing site or building, except with specific written approval by the Architect in each case.
- 32.9 Patch areas requiring patching, including damage caused by removing, relocating or adding fixtures and equipment, damages caused by demolition at adjacent materials.
- 32.10 Do not stockpile debris in the existing building, without the approval of the Architect. Remove debris as it accumulates from removal operations to a legal disposal area.
- 32.11 Contractor to assume existing oil filled and dry transformers, oil switches, ballasts, lamps, wooden poles, cross arms, computers, computer monitors, and conductor insulation containing materials considered hazardous. Comply with local, state and federal regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution. Contractor shall be responsible for removal of the above hazardous materials where encountered. Include all costs for such removal as part of this contract.
- 32.12 All fluorescent, compact fluorescent, high intensity discharge, metal halide, mercury vapor, high and low-pressure sodium, and neon lamps are to be disposed of as required by the California Waste Rule Regulations as described in the California Code of Regulations, Title 22, Division 4.5 and Chapter 23.
- 32.13 **Communication System:** Where new communication systems, (including telephone, intercom, clock, security, fire alarm, data, multimedia, CATV or lighting controls) are installed to replace existing systems, unless where otherwise directed the existing systems shall remain fully operational until the new system has been installed and tested. Demolition of the existing systems shall include removal of all equipment and associated wiring and exposed conduits and providing new blank covers for all abandoned device locations.
- 32.14 **Salvage Power Equipment:** The Contractor shall carefully remove all existing switchboards, panelboards, transformers, and confirm in writing which items the Owner

wishes to keep. These items shall be transported to the Owner's maintenance facilities by the Contractor. All remaining items shall be disposed of by the Contractor.

- 32.15 **Salvage Lighting Equipment:** The Contractor shall confirm in writing which items the Owner wishes to keep. These items shall be transported to the Owner's maintenance facilities by the Contractor. All remaining items shall be disposed of by the Contractor.
- 32.16 **Salvage Communication Equipment:** The Contractor shall carefully remove all communication devices (telephone, intercom, clock, security, fire alarm, data, multimedia, CATV or lighting controls) and box each type of devices separately. The Contractor shall deliver all items to the Owner's maintenance facility.

ARTICLE 33 PROJECT CLOSEOUT

- 33.1 Prior to completion of project, compile a complete equipment maintenance manual for all equipment supplied under sections of this Division, in accordance with Division 1 of these specifications and as described below.
- 33.2 Equipment Lists and Maintenance Manuals:
- 33.2.1 Prior to completion of job, Contractor shall compile a complete equipment list and maintenance manuals. The equipment list shall include the following items for every piece of material equipment supplied under this Section of the specifications:
- 33.2.1.1 Name, model, and manufacturer.
- 33.2.1.2 Complete parts drawings and lists.
- 33.2.1.3 Local supply for parts and replacement and telephone number.
- 33.2.1.4 All tags, inspection slips, instruction packages, etc., removed from equipment as shipped from the factory, properly identified as to the piece of equipment it was taken from.
- 33.3 Maintenance manuals shall be furnished for each applicable section of the specifications and shall be suitably bound with hard covers and shall include all available manufacturers' operating and maintenance instructions, together with "as-built" drawings to properly operate and maintain the equipment. The equipment lists and maintenance manuals shall be submitted in duplicate to the Architect for approval not less than 10 days prior to the completion of the job. The maintenance manuals shall also include the name, address, and phone numbers of all subcontractors involved in any of the work specified herein. Four copies of the maintenance manuals bound in single volumes shall be provided.

ARTICLE 34 RECORD DRAWINGS

- 34.1 The Division 26 Contractor shall maintain record drawings as specified in accordance with Division 1 of these specifications, and as noted below.
- 34.2 Drawings shall show locations of all concealed underground conduit runs, giving the number and size of conduit and wires. Underground ducts shall be shown with cross section elevations and shall be dimensioned in relation to permanent structures to indicate their exact location. Drawing changes shall not be identified only with referencing CORs and RFIs, the drawings shall reflect all of the actual additions or

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changes made. All as-built drawing information shall be prepared by the contractor in AutoCAD, updating the contract computer files as needed to reflect actual installed conditions for all site plans, lighting, power, communication, networking, audio visual, security or fire alarms systems included in the scope of work for this project.

- 34.3 One set of these record drawings shall be delivered to the Architect. The engineer will review documents for completeness and will not be responsible for editing contractor computer files.

ARTICLE 35 CHANGES AND EXTRA WORK

- 35.1 When **changes** in work are requested, the Division 26 Contractor shall provide unit prices for the work involved in accordance with Division 1 of these specifications, and the following:

35.1.1 The material Costs shall **not exceed** the latest edition of the "Trade Service" end column "C" price list. The materials prices may be higher only where the Contractor can produce invoices to substantiate higher material costs. The Contractor shall submit a print out copy of the trade service sheets with the change order to substantiate these values.

35.1.2 The labor Costs shall **not exceed** the latest edition of the "NECA Manual of Labor Units" **normal column**.

- 35.2 When **credits** in work are requested, the Division 26 Contractor shall provide unit prices for the work involved in accordance with Division 1 of these specifications, and the following:

35.2.1 The Material Costs shall **not be less than 80% of** the latest edition of the "Trade Service" end column price list. The materials prices may be lower only where the Contractor can produce invoices to substantiate lower material costs. Restocking fees may also be included in this amount where applicable.

35.2.2 The Labor Costs shall **not be less than 80% of** the latest edition of the "NECA Manual of Labor Units" **normal column**.

- 35.3 Conduit pricing for conduits of all types sized 3" or smaller.

When changes in the scope of work require the Contractor to estimate conduit Installations, they shall **NOT include labor values (only material cost may be included)** for any of the below items. The labor values for conduit installation represented in the NECA manual are inflated to a point where additional labor for the below items can not be justified.

35.3.1 Couplings.

35.3.2 Set Screw or Compression Fittings, locknuts, Bushings and washers.

35.3.3 Conduit straps and associated screws or nails.

35.3.4 LB fittings or other specialty fittings or specialty mounting hardware may be included where needed.

- 35.4 Wire pricing for all types and sizes.

When changes in the scope of work require the Contractor to estimate wire installations, they shall **NOT include labor values (only material cost may be included)** for any of the below items. The labor values for wire installation represented in the NECA manual are inflated to a point where additional labor for the below items can not be justified.

35.4.1 Locknuts, Bushings, tape, wire markers.

35.5 When changes in the scope of work require other equipment installations such as lighting fixtures, panelboards, switchboards, wiring devices, communications equipment etc. the Contractor shall **NOT include labor values (only material cost may be included)** for any of the below items. The labor values for these equipment items represented in the NECA manual are inflated to a point where additional labor for the below items can not be justified.

35.5.1 Associated screws, nails, bolts, anchors or supports.

35.5.2 Locknuts, washers, tape.

35.6 The total labor hours for extra work will be required to be calculated as follows:

35.6.1 Change orders with 1 to 30 total labor hours

General Laborer	10%	of total labor hours
Journeyman	10%	of total labor hours
Foreman	80%	of total labor hours

35.6.2 Change orders with 31 to 100 total labor hours

General Laborer	20%	of total labor hours
Journeyman	40%	of total labor hours
Foreman	40%	of total labor hours

35.6.3 Change orders with over 100 total labor hours

General Laborer	30%	of total labor hours
Journeyman	50%	of total labor hours
Foreman	20%	of total labor hours

35.7 When change orders are issued which allow the work to be completed in the normal sequence of construction, the labor rates shall be based on the most current "Prevailing Wage" – straight time total hourly rate. When change orders require the Contractor to work out of sequence the "Prevailing Wage"– daily overtime hourly rate shall apply. Special condition situations shall be reviewed on an individual basis for alternate hourly rate schedules.

35.8 Costs **will not** be permitted for additional supervision on site or office time for processing any change order other than the 10% overhead allowance as described in Division 1. Cost for special equipment required to install items for an individual change order are permitted and must be individually identified. Lump Sum cost for small tools or any other cost not specifically required for the change order are not permitted.

35.9 Contractor estimates shall be formatted to clearly identify each of the following:

35.9.1 Line item description of each type of material or labor item.

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- 35.9.2 Description of quantity for each item.
- 35.9.3 Description of (material cost per / quantity).
- 35.9.4 Description of (labor cost per / quantity).
- 35.9.5 Description of total labor hour breakdown per Foreman, Journeyman or General Laborer as described above.

ARTICLE 36 ELECTRONIC FILES

- 36.1 The Contractor shall make a **written** request directly to Johnson Consulting Engineers for electronic drawing files. As a part of the written request, please include the following information:
 - 36.1.1 Clearly indicate each drawing sheet needed (i.e., E1.1, E2.1, etc.).
 - 36.1.2 Identify the name, phone number, mailing address and e-mail address of the person to receive the files.
 - 36.1.3 Provide written confirmation and agreement with the requirements described for payment of computer files, as described below.
- 36.2 Detail or riser diagram sheets, or any other drawings other than floor plans or site plans, **will not be made available to the Contractor.**
- 36.3 Files will only be provided in the AutoCAD format in which they were created.
- 36.4 Requests for files will be processed as soon as possible; a minimum of 7 working days should be the normal processing time. The Contractor shall be completely responsible for requesting the files in time for their use.
- 36.5 CAD files will be made available via e-mail or on disk, depending on the quantity of files requested. The Contractor requesting the files will be required to pay \$50.00 per drawing plan, or \$300.00 maximum, whichever is **less.**

END OF SECTION

SECTION 26 05 19

POWER CONDUCTORS

PART 1 – GENERAL

- 1.1 Furnish and install wire and cable for branch circuits and feeders specified herein and as shown on the electrical drawings.
- 1.2 Submittals: Submit manufacturers' data for the following items:
 - 1.2.1 All cables and terminations
- 1.3 **Common submittal mistakes which will result in the submittals being rejected:**
 - 1.3.1 Not including all items listed in the above itemized description.
 - 1.3.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining, or clouding the items to be reviewed, or crossing out the items which are not applicable.
 - 1.3.3 Not including actual manufacturer's catalog information of proposed products.
 - 1.3.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed

PART 2 – PRODUCTS

- 2.1 Wire and cable Rated 120 volt to 600 volt.
 - 2.1.1 All wire and cable shall be new, 600 volt insulated copper, of types specified below for each application. All wire and cable shall bear the UL label and shall be brought to the job in unbroken packages. Wire insulation shall be the color as specified herein and shall be type THWN-2. Insulated conductors shall be installed in all exterior exposed raceways. Conductors for branch circuit lighting, receptacle, power and miscellaneous systems shall be a minimum of No. 12 AWG. Increase conductor size to No. 10 AWG for 120 volt circuits greater than 100 feet from the panel to the load and for 277 volt circuits greater than 200 feet from the panel to the load. Circuit home-runs indicated to be larger than No. 12 must be increased the entire length of the circuit, including equipment grounding conductor. Wire sizes No. 14 through No. 10 shall be solid. No. 8 and larger shall be stranded.
 - 2.1.2 Aluminum conductors will be permitted (only where specifically identified on the drawings. See "600 Volt Feeder Schedule") in sizes 2/0 or larger. Conductors shall be listed by Underwriters Laboratories (UL) and suitable for operation at 600 volts or less, at a maximum operating temperature of 90N C maximum in wet or dry locations. Conductors shall be marked "SUN-RES". Aluminum alloy conductors shall be compact stranded conductors of STABILOY® (AA-8030) as manufactured by Alcan Cable or Listed equal. AA-8000 Series aluminum alloy conductor material shall be recognized by The Aluminum Association.
 - 2.1.3 MC type armored cable reference Section 26 05 33.

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- 2.2 Wire and cable for systems below 120 volts.
 - 2.2.1 All low voltage and communications systems cables routed underground shall be provided with a moisture resistant outer jacket, West Penn "Aquaseal" or equal, unless otherwise specified.

PART 3 - EXECUTION

- 3.1 Wire and cable shall be pulled into conduits without strain using powdered soapstone, mineralac, or other approved lubricant. In no case shall wire be repulled if same has been pulled out of a conduit run for any purpose. No conductor shall be pulled into conduit until conduit system is complete, including junction boxes, pull boxes, etc.
- 3.2 All connections of wires shall be made as noted below:
 - 3.2.1 Connections to outlets and switches: Wire formed around binding post of screw.
 - 3.2.2 No. 10 wire and smaller: Circuit wiring connections to lighting fixtures and other hardwired equipment shall be made with pressure type solderless connectors, Buchanan, Scotchlock, Wing Nut, or approved equal. Alternate "WAGO" #773 series or "IDEAL" #32, 33, 34 and 39 series push wire style connectors are also acceptable.
- 3.3 All wiring shall be continuous without splicing unless where specifically noted on the drawings or where permitted below.
 - 3.3.1 No. 10 wire and smaller above grade: Quantities as needed, connection made with pressure type solderless connectors, Scotchlock or equal.
 - 3.3.2 No. 10 wire and smaller below grade: Quantities as needed, connection made with 'Raychem' long barrel compression terminals with crimping tool and quantity of crimps as recommended by manufacturer, provide 'Raychem' WCSM-S series in-line heat shrink, sealant coated splice kit. Alternate products must be UL listed for direct burial/submersible and rated to (1000V).
 - 3.3.3 No. 8 wire and larger above grade: Quantities only where indicated, 'Raychem' long barrel compression terminals with crimping tool and quantity of crimps as recommended by manufacturer, provide 'Raychem' WCSM-S series in-line heat shrink, sealant coated splice kit. Alternate products must be UL listed for direct burial/submersible and rated to (1000V).
 - 3.3.4 No. 8 wire and larger below grade: Quantities only where indicated, 'Raychem' long barrel compression terminals with crimping tool and quantity of crimps as recommended by manufacturer, provide 'Raychem' WCSM-S series in-line heat shrink, sealant coated splice kit. Alternate products must be UL listed for direct burial/submersible and rated to (1000V).
- 3.4 All wiring throughout shall be color coded as follows:

	<u>480 volt system</u>	<u>208 or 240 volt system</u>
A Phase	Brown	Black
B Phase	Orange	Red
C Phase	Yellow	Blue

Neutral
Ground

Grey
Green

White
Green

- 3.5 Wiring must be color coded throughout its entire length, except feeders may have color coded plastic tape at both ends and any other accessible point.
- 3.6 All control wiring in a circuit shall be color coded, each phase leg having a separate color, and with all segments of the control circuit, whether in apparatus or conduit, utilizing the same color coding.
- 3.7 At all terminations of control wiring, the wiring shall have a numbered T&B or Brady plastic wire marker.
- 3.8 Cables when installed are to be properly trained in junction boxes, etc., and in such a manner as to prevent any forces on the cable which might damage the cable.
- 3.9 All conductors to be installed into a common raceway, shall be pulled into the raceway at the same time.
- 3.10 All conductors shall be installed in such a manner as to not exceed the manufacturers' recommended pulling tension and bending radius. The equipment used for pulling must be specifically designed for the purpose. Motorized vehicles such as pickup trucks, are not acceptable.

END OF SECTION

SECTION 26 05 26

GROUNDING

PART 1 – GENERAL

- 1.1 Furnish and install grounding and grounding conductors and electrodes as specified herein and as shown on the drawings.
- 1.2 Submit catalog data for all components.
- 1.3 **Common submittal mistakes which will result in the submittals being rejected:**
 - 1.3.1 Not including all items listed in the above itemized description.
 - 1.3.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.
 - 1.3.3 Not including actual manufacturer's catalog information of proposed products.
 - 1.3.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 – EXECUTION

- 2.1 Grounding
 - 2.1.1 All panelboard cabinets, equipment, enclosures, and complete conduit system shall be grounded securely in accordance with pertinent sections of CEC Article 250. Conductors shall be copper. All electrically operated equipment shall be bonded to the grounded conduit system. All non-current carrying conductive surfaces that are likely to become energized and subject to personal contact shall be grounded by one or more of the methods detailed in CEC Article 250. All ground connections shall have clean contact surfaces. Install all grounding conductors in conduit and make connections readily accessible for inspection.
 - 2.1.2 Provide an insulated equipment grounding conductor in all branch circuit and feeder raceway systems, sized in accordance with CEC 250-122.
 - 2.1.3 Provide an additional individual insulated grounding conductor for each circuit which contains an isolated ground receptacle or surge suppression receptacle.
 - 2.1.4 Grounding of metal raceways shall be assured by means of provisions of grounding bushings on feeder conduit terminations at the panelboard, and by means of insulated continuous stranded copper grounding wire extended from the ground bus in the panelboard to the conduit grounding bushings.
 - 2.1.5 Except for connections which access for periodic testing is required, make grounding connections which are buried or otherwise inaccessible by exothermic type process.
 - 2.1.6 The following ohmic values shall be test certified for each item listed. A written report signed and witnessed by the project IOR shall be provided to the engineer.

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If the ohmic value listed cannot be obtained additional grounding shall be installed to reach the value listed.

2.1.6.1 Service.10 ohms.

2.1.6.2 Step down transformers and non-current carrying metal parts
. 25 ohms.

2.1.6.3 Manholes, handholes, etc.
. 10 ohms.

END OF SECTION

SECTION 26 05 33

CONDUIT AND FITTINGS

PART 1 – GENERAL

- 1.1 Furnish and install conduit and fittings as shown on the drawings and as specified herein.
- 1.2 Submit Manufacturer's data on the following:
 - 1.2.1 Conduit.
 - 1.2.2 Fittings
 - 1.2.3 Fire stopping Material.
 - 1.2.4 Surface Raceways.
 - 1.2.5 Type MC or MC-PCS cable, provide construction details and UL "E" number.
- 1.3 **Common submittal mistakes which will result in the submittals being rejected:**
 - 1.3.1 Not including all items listed in the above itemized description.
 - 1.3.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.
 - 1.3.3 Not including actual manufacturer's catalog information of proposed products.
 - 1.3.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 – PRODUCTS

- 2.1 Rigid steel conduit, intermediate metal conduit (IMC), electrical metallic tubing (EMT) and flexible metallic conduit shall be steel, hot dipped galvanized after fabrication.
- 2.2 PVC conduit shall be Carlon or approved equal.
- 2.3 Liquid tight flexible metal conduit shall be Anaconda Sealtite type UA or approved equal. Fittings shall be Appleton, Crouse-Hinds, Steel City, T&B, or equivalent.
- 2.4 MC type armored cable, when utilized, shall be provided with the following:
 - 2.4.1 Comply with UL 1479 and CEC 330
 - 2.4.2 90°C, copper, THHN conductors.
 - 2.4.3 Minimum #12 insulated grounding conductor.
 - 2.4.4 Conductors sized No. 10 and smaller shall be solid, No. 8 and larger shall be stranded.

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- 2.4.5 Oversized (150%) neutrals or separate neutrals shall be provided.
- 2.4.6 Increase phase conductors to No. 10 AWG for 120 volt circuits greater than 100 feet from panel to load and for 277 volt circuits greater than 200 feet from panel to load. Where required increase conductor sizes for entire length of circuit.
- 2.4.7 Interlocked armored aluminum sheath.
- 2.4.8 AC or BX type armored cable shall **not** be substituted in lieu of MC type cable.
- 2.4.9 Color code cable according to cable type and configuration.
- 2.4.10 Acceptable manufacturers are AFC and Alflex.
- 2.5 MC-PCS luminary armored cable, when utilized, shall be provided with the following:
 - 2.5.1 Comply with UL 1479 and CEC 330
 - 2.5.2 90°C, copper, THHN conductors.
 - 2.5.3 Minimum #12 insulated grounding conductor.
 - 2.5.4 Lighting phase conductors sized No. 10 and smaller shall be solid, lighting control conductors shall be sized no. 16 solid.
 - 2.5.5 Interlocked armored aluminum sheath.
 - 2.5.6 AC or BX type armored cable shall **not** be substituted in lieu of MC type cable.
 - 2.5.7 Color code phase cable according to cable type and configuration. color code control conductors purple/gray.
 - 2.5.8 Acceptable manufacturers are AFC and Alflex.
- 2.6 Fire stopping material shall provide an effective seal against fire, heat, smoke and fire gases. Fire stopping material shall be tested to comply with ASTM E 814 and UL 1479. The submittal for this product shall include the UL listed system number and installation requirements for each type of penetration seal required for this project.
- 2.7 Each length of conduit shall be stamped with the name or trademark of the manufacturer and shall bear the UL label.
- 2.8 All plastic conduit shall be rigid, schedule 40, heavy wall PVC. All PVC conduit shall be UL listed. Underground utility company conduits shall comply with local utility co. requirements.
- 2.9 Plastic conduit shall be stored on a flat surface and protected from the direct rays of the sun.
- 2.10 Where branch circuit or communication raceways cannot be concealed in ceilings or walls and are required to be exposed in interior spaces, provide nonmetallic surface raceway system sized per the manufacturer capacity requirements. A full complement of nonmetallic fittings must be available and matching device boxes and cover plates must be provided. The color of the raceway system, components and boxes shall be (white). Where data networking cabling is to be installed, all raceway fittings shall meet Category

5 radius requirements. Where specific raceway types have been noted on the drawings they shall be as follows:

2.10.1	System 'SR'	Hubbell Wiremold Panduit Hellerman-Tyton	WALLTRAK 1 series ECLIPSE PN05series LD5 series TSR2 series
2.10.2	System 'SR2'	Hubbell Wiremold Panduit Hellerman-Tyton	WALTRAK 22 2300D Series D2P10 TSR3 series
2.10.3	System 'SR3'	Hubbell Wiremold Panduit Hellerman-Tyton	BASETRAK series 5400 - series 70 series MCR Infostream" series

Provide with offset boxes, inline boxes may only be used where specifically shown on the drawings.

PART 3 – FITTINGS

- 3.1 All metallic fittings, including those for EMT, flexible conduit, or malleable iron. Die cast fittings of any other material are not permitted.
- 3.2 Locknuts shall be steel or malleable iron with sharp clean cut threads.
- 3.3 Entrance seals shall be 0.Z. type FSK or equivalent.
- 3.4 Bushings and locknuts: Where conduits enter boxes, panels, cabinets, etc., they shall be rigidly clamped to the box by locknuts on the outside, and a lock nut and plastic bushing on the inside of the box. All conduits shall enter the box squarely.
- 3.5 Furnish and install insulated bushings as per CEC article No. 300 - 4 (F) on all conduits. The use of insulated bushings does not exclude the use of double locknuts to fasten conduit to the box.
- 3.6 Transition from plastic to steel conduits shall be with PVC female threaded adaptors.
- 3.7 Couplings and connectors for rigid steel or IMC conduit must be threaded, or compression type (set screw fittings are not permitted).
- 3.8 Couplings and connectors for EMT shall be compression, watertight. Set screw connectors are not acceptable, except for systems below 120 volts.
- 3.9 MC or MC-PCS type armored cable shall be provided with listed clamp type die cast zinc set screw connectors. Anti-short bushings shall be provided at all cable ends.
- 3.10 Connectors for flexible metal conduit shall be steel or malleable iron with screw provided to clinch the conduit into the adapter body. For sizes up to ¾" a screw-in, "Jake type," fitting may be used.
- 3.11 Install approved expansion fittings, or liquid tight flex conduit with a minimum 6" slack for conduits passing through all expansion and seismic joints.

PART 4 - EXECUTION

- 4.1 All branch circuits shall be installed concealed in walls or above ceilings or in concrete floor slabs. PVC conduits installed in concrete floor slabs shall transition to PVC coated rigid steel where conduits penetrate above finished grade or finished floor.
- 4.2 Conduit sizes for various numbers and sizes of wire shall be as required by the CEC, but not smaller than 1/2" for power wiring and 3/4" for communications and fire alarm systems unless otherwise noted. Conduit in slab or below grade shall be 3/4" minimum trade size, unless otherwise identified.
- 4.3 Conduit size shall be such that the required number and sizes of wires can be easily pulled in and the Contractor shall be responsible for the selection of the conduit sizes to facilitate the ease of pulling. Conduit sizes shown on the drawings are minimum sizes in accordance with appropriate tables in the CEC. If because of bends or elbows a larger conduit size is required, the Contractor shall so furnish without further cost to the Owner.
- 4.4 The Contractor shall be entirely responsible for the proper protection of this work from the other trades on the job. When conduit becomes bent or holes are punched through same, or outlets moved after being roughed-in, the Contractor shall replace same, without additional cost to the Owner.
- 4.5 Rigid steel conduit or IMC shall be used as follows:
 - 4.5.1 Exposed exterior locations.
 - 4.5.2 Exposed interior locations below eight feet above floor, except in electrical rooms and closets.
 - 4.5.3 In hazardous or classified areas as required by CEC.
- 4.6 EMT conduit shall be used for areas as follows:
 - 4.6.1 All interior communications, signal, and data networking systems.
 - 4.6.2 All interior power wiring systems where not required to be in rigid steel, IMC or flexible conduit.
- 4.7 Flexible conduit shall be used for areas as follows:
 - 4.7.1 To connect motors, transformers, and other equipment subjected to vibration or where specifically detailed on the drawings.
 - 4.7.2 Flexible conduit shall not be used to replace EMT in other locations where the conduit will be exposed.
 - 4.7.3 Flexible metal conduit shall be ferrous. Installation shall be such that considerable slack is realized. The conduit shall contain separate code sized grounding conductor.
 - 4.7.4 Liquid tight flexible conduit shall be used in conformance with CEC in lengths not to exceed 4'. For equipment connections, route the conduit at 90 degrees to the adjacent path for point of connection. The conduit shall contain separate code sized grounding conductor. Use liquid tight flexible conduit for all equipment

connections exposed in possible wet, corrosive or oil contaminated areas, e.g., shops and outside areas.

- 4.8 MC armored cable may be used as follows:
- 4.8.1 All branch circuit wiring for lighting and power circuits where permitted and installed in compliance with UL 1569 and CEC 330.
- 4.9 MC-PCS luminary armored cable may be used as follows:
- 4.9.1 All Lighting branch circuit wiring for lighting circuits where permitted and installed in compliance with UL 1569 and CEC 300-22(c), 330. This cable permits conductors of control circuits to be placed in a cable with lighting power circuits or class 1 circuits.
- 4.9.2 It shall not be considered an acceptable option to install lighting control class 1 circuits as an open wire installation.
- 4.10 MC and MC-PCS armored cable shall **not** be used for the following areas:
- 4.10.1 Any exterior, underground or buried in concrete circuits.
- 4.10.2 Any circuits feeding HVAC equipment or pumps or any circuit with 30 AMPs or greater overcurrent protection.
- 4.10.3 Any exposed interior locations except in electrical, communication or mechanical equipment rooms.
- 4.10.4 Any exposed interior damp/wet locations, kitchens, science classrooms, shop areas, or concealed in science classroom casework, unless provided with approved PVC jacket.
- 4.10.5 Any hazardous rated area.
- 4.11 Plastic conduit shall be used for all exterior underground, in slab, and below slab on grade conduit installations. Install bell ends at all conduit terminations in manholes and pull boxes. Where plastic conduit transitions from below grade to above grade, no plastic conduit shall extend above finished exterior grade, or above interior finished floor level.
- 4.12 Plastic conduit joints shall be made up in accordance with the manufacturer's recommendations for the particular conduit and coupling selected. Conduit joint couplings shall be made watertight. Plastic conduit joints shall be made up by brushing a plastic solvent cement on the inside of a plastic fitting and on the outside of the conduit ends. The conduit and fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly.
- 4.13 All underground conduit depths shall be as detailed on the drawings or a minimum of 30" below finished grade (when not specifically detailed otherwise), for all exterior underground conduits. Where concrete slurry or concrete encasement is provided, include "Red" color dye in mixture.
- 4.14 All underground conduits for power systems (600v and higher), shall be concrete encased and a minimum of 48" below grade or as detailed on the drawings. Where concrete slurry or concrete encasement is provided, include "Red" color dye in mixture.

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- 4.15 Conduit shall be continuous from outlet to outlet, cabinet or junction box, and shall be so arranged that wire may be pulled in with the minimum practical number of junction boxes.
- 4.16 All conduits shall be concealed wherever possible. All conduit runs may be exposed in mechanical equipment rooms, electrical equipment rooms, electrical closets, and in existing or unfinished spaces. No conduit shall be run exposed in finished areas without the specific approval of the Architect.
- 4.17 All raceways which are not buried or embedded in concrete shall be supported by straps, clamps, or hangers to provide a rigid installation. Exposed conduit shall be run in straight lines at right angles to or parallel with walls, beams, or columns. In no case shall conduit be supported or fastened to other pipes or installed to prevent the ready removal of other trades piping. Wire shall not be used to support conduit.
- 4.18 It shall be the responsibility of the Contractor to consult the other trades before installing conduit and boxes. Any conflict between the location of conduit and boxes, piping, duct work, or structural steel supports, shall be adjusted before installation. In general, large pipe mains, waste, drain, and steam lines shall be given priority.
- 4.19 Conduits above lay-in grid type ceilings shall be installed in such a manner that they do not interfere with the "lift-out" feature of the ceiling system. Conduit runs shall be installed to maintain the following minimum spacing wherever practical.
 - 4.19.1 Water and waste piping not less than 3".
 - 4.19.2 Steam and steam condensate lines not less than 12".
 - 4.19.3 Radiation and reheat lines not less than 6".
- 4.20 Provide all necessary sleeves and chases required where conduits pass through floors or walls as part of the work of this section. Core drilling will only be permitted where approved by the Architect.
- 4.21 All empty conduits and surface mounted raceways shall be provided with a ¼" polypropylene plastic pull cord and threaded plastic or metal plugs over the ends. Fasten plastic "Dymo" tape label to exposed spare conduit to identify "power" or "communication" system, and to where it goes.
- 4.22 The ends of all conduits shall be securely plugged, and all boxes temporarily covered to prevent foreign material from entering the conduits during construction. All conduit shall be thoroughly swabbed out with a dry swab to remove moisture and debris before conductors are drawn into place.
- 4.23 Bending: Changes in direction shall be made by bends in the conduit. These shall be made smooth and even without flattening the pipe or flaking the finish. Bends shall be of as long a radius as possible, and in no case smaller than CEC requirements.
 - 4.23.1 For power conduits for conductors (600v and below), provide minimum 36" radius (vertical) and 72" radius (horizontal) bends.
 - 4.23.2 For power conduits for conductors (greater than 600v), provide minimum 72" radius (vertical) and 72" radius (horizontal) bends.
- 4.24 Supports: Conduit shall be supported at intervals as required by the California Electrical Code. Where conduits are run individually, they shall be supported by approved conduit

straps or beam clamps. Straps shall be secured by means of toggle bolts on hollow masonry, machine screws or bolts on metal surfaces, and wood screws on wood construction. **[No perforated straps or wire hangers of any kind will be permitted. Where individual conduits are routed, or above ceilings, they shall be supported by hanger rods and hangers.]** Conduits installed exposed in damp locations shall be provided with clamp backs under each conduit clamp, to prevent accumulation of moisture around the conduits.

- 4.25 Where a number of conduits are to be run exposed and parallel, one with another, they shall be grouped and supported by trapeze hangers. Hanger rods shall be fastened to structural steel members with suitable beam clamps or to concrete inserts set flush with surface. A reinforced rod shall be installed through the opening provided in the concrete inserts. Beam clamps shall be suitable for structural members and conditions. Rods shall be galvanized steel 3/8" diameter minimum. Each conduit shall be clamped to the trapeze hanger with conduit clamps.
- 4.26 All concrete inserts and pipe clamps shall be galvanized. All steel bolts, nuts, washers, and screws shall be galvanized or cadmium plated. Individual hangers, trapeze hangers and rods shall be prime-coated.
- 4.27 Openings through fire rated floors/walls and/or smoke walls through which conduits pass shall be sealed by Fire stopping material to comply with Division 1 to seal off flame, heat, smoke and fire gases. Sleeves shall be provided for power or communication system cables which are not installed in conduits, and shall be sealed inside and out to comply with manufacturers UL system design details. Where multiple conduits and/or cable tray systems pass thru fire-rated walls at one location, the Contractor shall submit copies of the manufacturers UL system design details proposed for use on this project. All Fire stopping material shall have an hourly fire-rating equal to or higher than the fire rating of the floor or wall through which the conduit, cables, or cable trays pass.
- 4.28 Provide cap or other sealing type fitting on all spare conduits. Conduits stubbed into buildings from underground where cable only extends to equipment, the conduit/cable end shall be sealed to prevent moisture from entering the room or space.
- 4.29 All conduits which are part of a paralleled feeder or branch circuit shall be installed underground.
- 4.30 All conduits which are required as a part of systems specified in Divisions 27 or 28, or any other low voltage communication systems, shall be furnished and installed by the Division 26 Contractor.
- 4.30.1 The Contractor shall coordinate all conduit requirements with each system supplier prior to bid to determine special conduit system requirements.
- 4.30.2 The Contractor shall provide a pull rope in all conduits for these systems.
- 4.30.3 The Contractor shall provide conduit sleeves for all open cable installations thru rated walls or block walls. Provide conduit from each building main termination cabinet or backboard to the nearest accessible ceiling for access into all electrical or communications rooms.
- 4.31 In addition to the above requirements, the following requirements shall apply to all data networking conduits:
- 4.31.1 Flexible metal conduit may only be used where required at building seismic and/or expansion joints.

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- 4.31.2 All underground conduits shall be provided with minimum 24" radius elbows (vertical) and 60" (horizontal).
- 4.31.3 No length of conduit above grade shall be installed to exceed 150 feet between pull boxes, or points of connection, unless where specifically detailed on the drawings.
- 4.31.4 No length of conduit shall be installed to exceed two 90 degree bends between pull boxes, or points of connection, unless where specifically detailed on the drawings.
- 4.32 Where surface raceways are installed in interior spaces, the Contractor shall take care to route in straight lines at right angles to or parallel with walls, beams, or columns. All raceways and device boxes shall be securely screwed to the finish surface with zinc screw "Auger" anchors Stk #ZSA1K by Gray Bar Electric or equal. Tape adhesive application will not be permitted.
- 4.33 The Contractor who installs surface raceway systems shall provide and install complete with wire retention clips, one for every (8) vertical feet or (5) horizontal feet or portion thereof. This Contractor shall also provide each raceway channel with pull strings.
- 4.34 It shall be the responsibility of the Contractor installing the raceway to coordinate the installation of raceway device plates and inserts with the communications or data contractors.
- 4.35 MC or MC-PCS cable shall be cut using a specific metallic sheath armor stripping tool. The use of hacksaws, dikes or any other tools not specifically designed to remove the armor sheath will not be permitted.
- 4.36 MC or MC-PCS cables installed in attic spaces or above lay-in ceilings shall be installed to be protected from physical damage. The cable shall be mounted along the sides or bottom of joists, rafters or studs.
- 4.37 Support wires used for supporting ceilings, lighting fixtures or other equipment items shall not be used to support MC or MC-PCS cables. Conduits, duct work, piping or any other equipment shall not be used to support or mount MC cables.
- 4.38 MC or MC-PCS cable supports, fasteners and clips shall be designed specifically for use with MC cables. Standard conduit supports, fasteners and clips, nails or other items are not permitted for installing MC cables.

END OF SECTION

SECTION 26 05 34

OUTLET AND JUNCTION BOXES

PART 1 – GENERAL

- 1.1 Furnish and install electrical wiring boxes as specified and as shown on the electrical drawings.
- 1.2 Submit manufacturer's data for all items.
- 1.3 **Common submittal mistakes which will result in the submittals being rejected:**
 - 1.3.1 Not including all items listed in the above itemized description.
 - 1.3.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.
 - 1.3.3 Not including actual manufacturer's catalog information of proposed products.
 - 1.3.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 – PRODUCTS

- 2.1 Boxes shall be as manufactured by Steel City, Appleton, Raco, or approved equal.
- 2.2 All boxes must conform to the provisions of Article 370 of the CEC. All boxes shall be of the proper size to accommodate the quantity of conductors enclosed in the box. Minimum box size shall be 4" square x 1-½" deep.
- 2.3 Boxes generally shall be hot dipped galvanized steel with knockouts. Boxes on exterior surfaces or in damp locations shall be corrosion resistant, cast ferrous and shall have threaded hubs for rigid conduit and neoprene gaskets for their covers. Boxes shall be Appleton Type FS, Crouse-Hinds, or the approved equal. Conduit bodies shall be corrosion resistant, cast malleable iron. Conduit bodies shall have threaded hubs for rigid conduit and neoprene gaskets for their covers. Conduit bodies shall be Appleton Unilets, Crouse-Hinds, or the approved equal. Where recessed, boxes shall have square cut corners.
- 2.4 Deep boxes shall be used in wall covered by wainscot or paneling and in walls or glazed tile, brick, or other masonry which will not be covered with plaster. Through the wall type boxes shall not be used unless specifically called for. All boxes shall be nongangable. Boxes in concrete shall be of a type to allow the placing of conduit without displacing the reinforcing bars. All lighting fixture outlet boxes shall be equipped with the proper fittings to support and attach a light fixture.
- 2.5 All light, switch, receptacle, fire alarm devices and similar outlets shall be provided with approved boxes, suitable for their function. Back boxes shall be furnished and installed as required for the equipment and/or systems under this contract.

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- 2.6 Pull and junction boxes shall be code gauge boxes with screw covers. Boxes shall be rigid under torsional and deflecting forces and shall be provided with angle from framing where required. Boxes shall be 4" square with a blank cover in unfinished areas and with a plaster ring and blank cover in finished areas. Covers for flush mounted oversize boxes shall extend $\frac{3}{4}$ " past boxes all around. Covers for 4" square boxes shall extend $\frac{1}{4}$ " past box all around.
- 2.7 All terminal cabinets and junction boxes or equipment back boxes which are required as a part of systems specified in Divisions 27 or 28, or any other low voltage communication systems, shall be furnished and installed by the Division 26 Contractor.
- 2.7.1 The Division 26 Contractor shall coordinate all box requirements with each system supplier prior to bid to determine special cabinet or back box requirements. The Contractor shall also provide stainless steel blank cover plates for all low voltage systems installed for future equipment.
- 2.7.2 The Contractor shall provide all plywood backboards indicated on walls or inside equipment enclosures. All backboards shall be a minimum of $\frac{3}{4}$ " thick fire rated type plywood.
- 2.7.3 The Contractor shall coordinate exact rough in locations and requirements with each system supplier.
- 2.8 In addition to the above requirements, boxes for data networking wiring and equipment shall comply with the following:
- 2.8.1 All boxes shall be a minimum of 4-11/16" square x 2-1/8" deep.
- 2.8.2 Where pull boxes are required on individual conduits 1- $\frac{1}{4}$ " or smaller, provide 4-11/16" square x 2-1/8" deep boxes. Where pull boxes are required on conduits larger than 1- $\frac{1}{4}$ " for straight pull through, provide eight times the conduit trade size for box length. Where pull boxes are required on conduits larger than 1- $\frac{1}{4}$ " for an angle or a U-pull through installation, provide a minimum distance of six times the conduit trade size between the entering and exiting conduit run for each cable.
- 2.9 Recessed boxes installed in fire rated floors/walls and /or smoke walls shall be sealed by Fire stopping material to comply with Division 1 to seal off flame, heat, smoke and fire gases. The Contractor shall submit copies of the manufacturers UL system design details proposed for use on this project. All Fire stopping material shall have an hourly fire-rating equal to or higher than the fire rating of the floor or wall through which the conduit, cables, or cable trays pass.

PART 3 – EXECUTION

- 3.1 Boxes shall be installed where required to pull cable or wire, but in finished areas only by approval of the Architect. Boxes shall be rigidly attached to the structure, independent of any conduit support. Boxes shall have their covers accessible. Covers shall be fastened to boxes with machine screws to ensure continuous contact all around. Covers for surface mounted boxes shall line up evenly with the edges of the boxes.
- 3.2 Outlets are only approximately located on the plans and great care must be used in the actual location of the outlets by consulting the various detailed drawings and specifications. Outlets shall be flush with finished wall or ceiling, boxes installed

symmetrically on such trim or fixture. Refer to drawings for location and orientation of all outlet boxes.

- 3.3 Furnish and install all plaster rings as may be required. Plaster rings shall be installed on all boxes where the boxes are recessed. Plaster rings shall be of a depth to reach the finished surface. Where required, extension rings shall be installed so that the plaster ring is flush with the finished surface.
- 3.4 All cabinets and boxes shall be secured by means of toggle bolts on hollow masonry; expansion shields and machine screws or standard precast inserts on concrete or solid masonry; machine screws or bolts on metal surfaces and wood screws on wood construction. All wall and ceiling mounted outlet boxes shall be supported by bar supports extending from the studs or channels on either side of the box. Boxes mounted on drywall or plaster shall be secured to wall studs or adequate internal structure.
- 3.5 Boxes with unused punched-out openings shall have the openings filled with factory-made knockout seals.
- 3.6 Where standby power and normal power are to be located in the same outlet box or 480V in a switch box, install partition barriers to separate the various systems.
- 3.7 All device boxes and junction boxes for fire alarm system shall be painted red and shall be 4-11/16" square by 2-1/8" deep. No exceptions.

END OF SECTION

SECTION 26 24 16

PANEL BOARDS

PART 1 – GENERAL

- 1.1 Furnish and install branch circuit panel boards as specified herein and as indicated on the drawings. Submit manufacturers' data on all items.
- 1.2 Submit manufacturers' data on all panel boards and components including:
 - 1.2.1 Enclosures and covers
 - 1.2.2 Breakers
 - 1.2.3 Surge Protective Device (SPD) equipment
 - 1.2.4 Incident energy level calculations
 - 1.2.5 Common submittal mistakes which will result in the submittals being rejected:
 - 1.2.5.1 Not arranging the circuit breakers in panels to match the orientations indicated on the drawings. In other words, if a 30 amp breaker is shown on the drawing in Space #2, this must be the location it appears on the submittal schedule. Standard factory arrangements will not be accepted.
 - 1.2.5.2 Not including all items listed in the above itemized description.
 - 1.2.5.3 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.
 - 1.2.5.4 Not including actual manufacturer's catalog information of proposed products.
 - 1.2.5.5 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 – PRODUCTS

- 2.1 The interrupting rating of circuit breakers shall be 10,000 amps for the 120/208 system and 14,000 amp for 277/480 volt systems. Refer to drawings for higher interrupting rating requirements. All components and equipment enclosures shall be manufactured by the same manufacturer. Circuit breakers shall be permitted to be series rated to limit the available fault current to no more than the above ratings.
- 2.2 All panels shall be fully bussed. Recessed panel enclosures shall be a maximum of 20" wide and 5-3/4" deep for all panels 600 amp rated and less.
- 2.3 All busses shall be tin-plated aluminum and shall be located in the rear of the panelboard cabinet. Individual circuit breakers shall be bolt on type and removable from the cabinet without disturbing the bussing in any way. All panel boards shall contain ground busses.
- 2.4 Panel covers shall be door in door style, with one lock. Door lock shall allow access to breakers only. Access to wireways without removal of cover shall be permitted by (non removable) screws

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behind the locked door. Panel cover shall be provided with full length piano hinge. All locks for all panels provided in this project shall be keyed alike.

- 2.5 Each panel shall have a two-column circuit index card set under glass or glass equivalent on the inside of the door. Each circuit shall be identified as to use and room or area. Areas shall be designated by room numbers. Room numbers shown on the drawings may change and contractor shall verify final room numbers with the architect prior to project completion.
- 2.6 Tandem mounted or wafer type breakers are not acceptable.
- 2.7 Multiple breakers shall have one common trip handle or be internally connected. Handle ties are not acceptable.
- 2.8 Breaker arrangements shown in the drawings shall be maintained. The circuit breakers in panels must match the orientations indicated on the drawings. In other words, if a 30 amp breaker is shown on the drawing in Space #2, this must be the location it appears on the submittal schedule. Standard factory arrangements will not be accepted.
- 2.9 Where conductor sizes exceed the standard breaker lug wire range, or where multiple conductors per phase are required, the panelboard manufacturer shall provide the breaker with suitable lugs for terminating the specified conductors.
- 2.10 Acceptable manufacturers are Square D, Eaton, Siemens or General Electric.
- 2.11 Equipment manufactured by any other manufacturers not specifically listed in Section 2.10 are not considered equal, or approved for use on this project.

Surge Protective Device (SPD)

- 2.12 Surge Protective Device (SPD) panelboards, shall be provided with an integrated circuit breaker panelboard and parallel connected suppression / filter system in a single enclosure. The SPD panelboard shall meet the following parameters: IEEE C62.41.1, IEEE C62.41.2, IEEE C62.45, UL 1283 and the UL 1449, Third Edition, effective September 29, 2009.
- 2.13 The panelboard shall be UL 67 Listed and the SPD shall be UL 1449 labeled as Type 1 or Type 2 or as Type 4 intended for Type 1 or Type 2 applications. SPD shall be factory installed integral to the panel board.
- 2.14 The SPD panelboard shall be top or bottom feed according to requirements. A circuit directory shall be located inside the door.
- 2.15 SPD shall meet or exceed the following criteria:
 - 2.15.1 For standard areas supply SPD having 100kA per phase surge current capacity. For mountain and desert areas (areas with over 5 lightning strikes per year), SPD shall have a per phase surge current capacity of 200kA.
 - 2.15.2 UL 1449 – Third Edition Revision; effective September 29, 2009, Voltage Protection Ratings shall not exceed the following:

<u>VOLTAGE</u>	<u>L-N</u>	<u>L-G</u>	<u>N-G</u>	<u>L-L</u>	<u>MCOV</u>
208Y/120	700V	700V	700V	1200V	150V
480Y/277	1200V	1200V	1200V	2000V	320V
 - 2.15.3 SPD shall be UL labeled with 100kA Short Circuit Current Rating (SCCR).

- 2.16 UL 1449 - Third Edition Revision; effective September 29, 2009, Voltage Protection Ratings shall not exceed the following:

<u>VOLTAGE</u>	<u>L-N</u>	<u>L-G</u>	<u>N-G</u>	<u>L-L</u>	<u>MCOV</u>
208Y/120	700V	700V	700V	1200V	150V
480Y/277	1200V	1200V	1200V	2000V	320V

- 2.17 SPD shall be UL labeled with a minimum 100kVA short circuit rated (SCCR).
- 2.18 UL 1449 Listed Maximum Continuous Operating Voltage (MCOV) (verifiable at UL.com):

<u>System Voltage</u>	<u>Allowable System Voltage Fluctuation (%)</u>	<u>MCOV</u>
208Y/120	25%	150V
480Y/277	15%	320V

- 2.19 SPD shall incorporate a UL 1283 listed EMI/RFI filter with minimum attenuation of - 50dB at 100 kHz. No filtering is required for a 100kA SPD.
- 2.20 Suppression components shall be heavy duty 'large block' MOVs, each exceeding 30mm diameter.
- 2.21 Type 4 SPD shall include a serviceable, replaceable module.
- 2.22 SPD shall be equipped with the following diagnostics:
- 2.22.1 Visual LED diagnostics including a minimum of one green LED indicator per phase, and one red service LED.
- 2.22.2 No other test equipment shall be required for SPD monitoring or testing before or after installation.
- 2.23 SPD shall have a response time no greater than 1/2 nanosecond
- 2.24 SPD shall have a 10 year warranty
- 2.25 The SPD panelboard shall have removable interior
- 2.26 The SPD panelboard main bus shall be aluminum and rated for the load current required
- 2.27 The SPD panelboard shall include a 200% rated neutral assembly with copper neutral bus
- 2.28 The unit shall be provided with a safety ground bus

(SPD) Quality Assurance

- 2.29 Manufacturer Qualifications: Engage a firm with at least 5 years experience in manufacturing transient voltage surge suppressors.
- 2.30 Manufacturer shall be ISO 9001 or 9002 certified.
- 2.31 The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of ten (10) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

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- 2.32 The SPD shall be compliant with the Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC.

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- 3.1 Painting of panelboard covers in finished areas shall be done by the general contractor.
- 3.2 Provide a spare 3/4" conduit stubbed to an accessible area for each of every three (3) spares or spaces provided in recessed panel boards.
- 3.3 All lugs shall be torque tested in the presence of the inspector of record.

Arc Flash and Shock Hazard

- 3.4 The Contractor is to provide, and submit to the engineer for approval, incident energy level calculations as determined using the methodologies described in NFPA 70E or IEEE standard 1584-2002.
- 3.4.1 **All studies shall be performed by "Emerson Electric" (858) 695-9551, MTA (858) 472-0193, or Terra Power Solutions (858) 380-8170. Studies performed by manufactures or other engineering or testing companies must submit qualifications for approval by Johnson Consulting Engineers, 7 days prior to bid for this project.**
- 3.5 A warning label, as specified in the above standard, shall be placed on each switchboard, panelboard, and safety switch indicating the incident energy levels on the equipment to warn qualified personnel in accordance with NFPA 70E, section 110.16 Labels shall be laminated white micarta with black lettering on each. Letters shall be no less than 3/8" high.
- 3.6 The incident level calculations for each piece of equipment shall be given to the owner and maintained on file by the maintenance department
- 3.7 The design goal is to minimize the incident energy to which a maintenance employee may be exposed.

END OF SECTION

SECTION 26 27 26

SWITCHES AND RECEPTACLES

PART 1 – GENERAL

- 1.1 Furnish and install all wiring devices as shown on drawings and as herein specified. Unless otherwise noted, device and plate numbers shown are Hubbell and shall be considered the minimum standard acceptable. Other acceptable manufacturers are Pass and Seymour, Leviton, General Electric and Bryant.
- 1.2 Submit manufacturers' data on all items.
- 1.3 **Common submittal mistakes which will result in the submittals being rejected:**
 - 1.3.1 Not correctly indicating ampacity rating of proposed devices.
 - 1.3.2 Not including all items listed in the above itemized description.
 - 1.3.3 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.
 - 1.3.4 Not including actual manufacturer's catalog information of proposed products.
 - 1.3.5 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 – PRODUCTS

- 2.1 All switches shall be of the quiet mechanical type, Specification Grade, 20 amp, 120/277 volt AC as follows:

	<u>HUBBELL</u>	<u>LEVITON</u>	<u>PASS & SEYMOUR</u>
Single Pole	CS120	CS1202	CS20AC1
Two Pole	CS1222	CS2202	CSB20AC2
Three-way	CS320	CS3202	CS20AC3
Key Switch	HBL1221L	1221-2L	PS20AC1-L

- 2.2 All switches shall have the "on" and the "off" position indicated on the handle. If switches of higher ampere ratings are required, they shall be of similar type and quality as those shown above. Groups of switches shown at one location shall be installed under a single plate up to a maximum of six where more than six switches are shown coordinate arrangement with the Architect.
- 2.3 Dimmer switches for incandescent lamp loads shall be square-law type, slide control dimmer with OFF position, Lutron or Hubbell "Nova-T" Series NT-600 (0-500 watt load), NT-1000 (501-900 watt load), NT-1500 (901-1500 watt load), or equal (no known equal).
- 2.4 All convenience receptacles and special outlets throughout shall be grounding type. Convenience receptacles shall be side wired, parallel slot, two pole, three wire, 20 amp as follows:

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	<u>HUBBELL</u>	<u>LEVITON</u>	<u>PASS & SEYMOUR</u>
Duplex	5352	5362	PS5362
GFCI	GFR5362	7899	2097
Isolated Ground	IG5362	5362IG	IG6300
Tamper Proof		8300SG	TR63H

- 2.5 All safety or tamper proof receptacles shall have no exposed external current carrying metal parts and shall have integral wiring leads suitable for two or three wire installations.
- 2.6 Special receptacles shall be as noted on the drawings.
- 2.7 Weatherproof plates shall be designed to meet CEC Article 410-57, wet location listed with cover "open." Where weatherproof receptacles have been identified to be provided with locking covers, the cover shall be as manufactured by Pass & Seymour #4600-8 or Cole Lighting 310 Series. Rough-in requirements vary between manufacturers. Contractor to field verify requirements prior to installation.
- 2.8 All plates throughout shall be stainless steel. Where wiring devices are installed in concrete block walls, provide oversized 3-1/2" x 5" cover plates.
- 2.9 All devices shall be white unless otherwise noted or a special purpose outlet.
- 2.10 Unless where specifically detailed on the drawings, floor boxes shall be PVC suitable for concrete poured floors of minimum 3-1/2" depth, with a modular design to gang two or three sections together.
 - 2.10.1 Carlon #E976 series or approved equal
 - 2.10.2 Provide brass cover with brass carpet flange unless otherwise detailed.

PART 3 – EXECUTION

- 3.1 Switches for room lighting shall be located no more than 12" center line from door jamb at plus 48" center line above finished floor or +46" to top of devices where located over casework, reference CBC Figure 11B-5D.
- 3.2 All receptacles shall be mounted at plus 18" to center line above finished floor unless noted or shown otherwise. All receptacles shall be installed with the ground pin up, at the top of the receptacle to comply with IEEE 602-1986.
- 3.3 Furnish and install wall plates for all wiring devices, and outlet boxes, including special outlets, sound, communication, signal, and telephone outlets, etc. as required. All cover plates shall be appropriate for type of device.

END OF SECTION

27 00 00

COMMUNICATION

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SECTION 27 01 00

COMMUNICATIONS GENERAL PROVISIONS

ARTICLE 1 - SUMMARY

- 1.1 This Division of the specifications outlines the provisions of the contract work to be performed as a sub contract under the Division 26 scope of work. Reference the Division 26 Electrical General Provisions for scope of work and general requirements.
- 1.2 In addition, work in this Division is governed by the provisions of the bidding requirements, contract forms, general conditions and all sections under Division 1 requirements.

END OF SECTION

SECTION 27 10 00

VOICE / DATA/ IP PAGE INFRASTRUCTURE

PART 1 – GENERAL

- 1.1 Include all labor, equipment and materials necessary for providing a complete networking infrastructure system as described herein and/or as indicated on the drawings.
- 1.2 Related specification sections:
 - 1.2.1 Section 26 01 00 – General Provisions
 - 1.2.2 Section 26 05 19 – Conductors
 - 1.2.3 Section 26 05 33 – Conduit and Fittings
 - 1.2.4 Section 26 05 34 – Outlet and Junction Boxes
- 1.3 Approved minimum Product and Contractor Extended Warranty Certifications.
 - 1.3.1 All components shall be manufactured by one of approved manufacturers, the installing Contractor must have the accompanying certification from the product manufacturer(s) for installation of an “Extended Warranted System” as required by each manufacturer and as indicated in these specifications.
 - 1.3.1.1 Specified system warranties are to be established between the component and cable manufacturers and the District, warranties between the cable manufacturer only or installing Contractor and the District are not considered equal.
 - 1.3.1.2 Warranty shall be a full “Performance Warranty” installed by a “Certified Contractor” as specified by one of the approved manufacturers. A “Component Warranty” will not be considered equal. All components, labor, and “Performance Criteria” shall be warranted by one of the approved manufacturers.
- 1.4 Acceptable manufacturers are:
 - 1.4.1 **LEVITON / BERK-TEK**
 - 1.4.1.1 Installing Contractor must be LEVITON Network Solutions Premier certified to install this system.
 - 1.4.1.2 Warranty provision and training must be for the Leviton/Berk-Tek – Limited Lifetime Premium Performance Warranty program.
 - 1.4.2 **COMMSCOPE**
 - 1.4.2.1 Commscope’s Training and Warranty programs encompass the brand names known as Systimax and Uniprise.
 - 1.4.2.2 Installing Contractor must be PartnerPro certified to install any of the systems under the Commscope Family of brand names. Alternate certification that apply as well is Systimax Premier Certification for products installed with the Systimax brand name.

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- 1.4.2.3 Warranty provision and training must be for the Commscope (Uniprise and Systimax) – 25-Year Premium Performance Warranty program.
- 1.4.3 **ORTRONICS (Legrand) /Superior Essex**
 - 1.4.3.1 Installing Contractor must be CIP-ESP or IP certified to install this system.
 - 1.4.3.2 Warranty provision and training must be for the nCompass – Lifetime Premium Performance program.
- 1.4.4 **Panduit/General Cable**
 - 1.4.4.1 Installing Contractor must be PanGen certified to install this system.
 - 1.4.4.2 Warranty provision and training must be for the PanGen Certification Plus – 25-Year Siemon Premium Performance program.
- 1.4.5 **Siemon**
 - 1.4.5.1 Installing Contractor must be Siemon Certified Installers (CI) certified to install this system.
 - 1.4.5.2 Warranty provision and training must be for the Premium 6 Certification – 20-Year Premium Performance program.
- 1.4.6 Warranty shall be to the District, for the period as defined by the Network Infrastructure System selected for installation, after District acceptance and sign-off of the completed system. The Contractor must provide documentation from one of the approved manufacturers, as indicated in Section 1.3, indicating their qualifications for installation of this system in compliance with the manufacturer/s warranty period requirements as warranted Contractor.
- 1.4.7 Equipment qualifications: It is the intent of these specifications that each bidder provides all hardware, components and installation services that are necessary to ensure a fully operational wiring system including warranties, as shown in the EIA/TIA Category-6 guidelines.
- 1.4.8 All components, parts, infrastructure, patch cables, termination panels and cables must be classified by the manufacturer or manufacturers as a part of the “Extended Warranty” program. Contractor may not mix in components from other certified programs or materials that are not considered part of the “Lifetime” warranty.
- 1.4.9 Systems or components as manufactured by any other manufacturer which, are not specifically listed in 1.3 are **not** approved for use on this project.
- 1.5 **Installing Contractor qualifications:** Firms and their personnel must be regularly engaged in the installation of data networking cabling and equipment for systems of similar type and scope. The Contractor must have a full-service office able to respond to emergency callouts during the warranty period. The Contractor must also provide complete installation of all wiring and devices or equipment. **Subcontractors with Electrical Contractors or other warranted or non-warranted Contractors for supervised installation of any part of this system are not approved.**

- 1.5.1 Contractor shall have on staff a minimum of (1) BICSI RCDD as full-time employees.
- 1.5.2 The successful Contractor shall be a California licensed C7 or C10 Premise Wiring Contractor as defined in this specification.
- 1.5.3 All work shall be performed under the supervision of a company accredited and trained by the Manufacturer of the components and cable and such accreditation must be presented with the bid submittal. All personnel performing work on this project must have successfully completed the manufacturer's training courses to completely comply with the extended warranty requirements prior to performance of any work on this project. Accreditation will consist of individual employee certifications issued by the manufacturer or manufacturers.
- 1.5.4 All personnel engaged in the testing of premises fiber optic and copper UTP cable systems must have successfully completed the test equipment manufacturer's training courses. Certification of such training must be presented with the bid submittal. Cut sheets of the test equipment to be utilized shall be provided with Phase I project material submittals.
- 1.5.5 This project shall employ Category-6 cabling. The Contractor shall install the related components in relation to the performance requirements for the type of cable installed.
- 1.5.6 If Contractor routes cable and/or associated pathways in another route than indicated on the drawings, they shall maintain all maximum cable installation distances as required by the manufacturer's distance limitations.
- 1.6 In order to ensure project cohesion, a single point of contact is required to provide a "TURNKEY" solution. The work covered under this section of the specification consists of furnishing all: labor, cabling, equipment, supplies, materials, and training.
- 1.7 The drawings indicate a schematic routing of cables above-ceiling cable prior to bid. Where cables penetrate through walls a conduit sleeve shall be provided. Where cables pass through fire rated walls, the conduit sleeve shall be sealed to maintain the rating of wall assembly.
- 1.8 Unless otherwise noted in the project drawings or these specifications, the Division 26 Contractor shall provide the installation of all conduits, outlet and junction boxes, trenching and pull box installation.
- 1.9 General Submittal Requirements
 - 1.9.1 **Group #1 Submittal** shall be made in electronic format within (20) working days after the award of the contract by the District. This submittal shall include the following:
 - 1.9.1.1 Complete Bill of Materials in Excel Spreadsheet format with bills of quantities, including all materials, components, devices, and equipment required for the work. The bills of quantities shall be tabulated respective of each and every system as specified, and shall contain the following information for each Section listed - Description and quantity of each product, Manufacturer's Name and Model Number, Manufacturer's Specification Sheet or Cut Sheet and Specification Item Number referenced for each required product or if

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not shown in the specifications, Drawing Detail Number being referenced. (ie; Spec. 27 20 00 Item 2.1.3 and/or Detail #1/E4.15).

- 1.9.1.2 Material Cut Sheets shall provide detailed product information and shall be original manufacturer product bulletins.
 - 1.9.1.3 Copies of material information from vendor websites shall not be considered equal and will not be accepted. Copies of Web pages which include multiple pages of irrelevant information not associated with the product cut sheet shall not be considered equal and will not be accepted.
 - 1.9.1.4 Material Cut Sheet part number provided shall be highlighted or provided with an arrow directed at the corresponding part number.
 - 1.9.1.5 Equipment items which have individual components will require that all component parts be listed individually.
 - 1.9.1.6 Description of any specialty backbox requirements
 - 1.9.1.7 All wiring types required for installation of this system
 - 1.9.1.8 Spare parts shall be listed individually to verify proposed quantity
 - 1.9.1.9 Include with submittals all warranty information and a description of support and maintenance services to be provided. Also include all licenses and maintenance agreements required for continued operation of the equipment.
- 1.9.2 **Group #2 Submittal** shall be provided within (20) working days after the approval of the Group # 1 submittals and prior to any fabrication or field conduit installations. All shop drawings shall be engineered and drawn on a CAD System. Each submission shall include 'D' or 'E' size print copies to match the contract drawings, and (1) USB Flash Drive copy with files in a AutoCAD format. Building floor plan CAD files will be made available. Contractor shall make the request for drawings in writing directly to Johnson Consulting Engineers, confirmation of the request and a release form will be forwarded to the contractor to include a signed copy prior to release of files. Detail or riser diagram sheets or any other drawings other than floor or site plans, will not be made available to the contractor. Phase II Submittals drawings shall include the following:
- 1.9.2.1 MDF and IDF equipment rack or cabinet elevations will be required to be provided including cable routing, grounding, support, UPS, network electronics, etc. and position of all components in the rack or cabinet.
 - 1.9.2.2 Provide labeling plan which identifies the proposed scheme for identifying all components including racks, patch panels (fiber and copper), site distribution feed cables, horizontal station cables and site conduit systems (handholes, pullboxes, etc.).
 - 1.9.2.3 Provide shop drawings showing all end device locations, tap values, paging zones and amplifier sizing for each zone for analog speakers and horns, including devices connected to IP-Based zone controllers.

- 1.9.3 Common submittal mistakes which will result in submittals being rejected:
 - 1.9.3.1 Not including the qualifications of the installing Contractor Company and Contractor's Staff.
 - 1.9.3.2 Not including all items listed in the above itemized description.
 - 1.9.3.3 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlights, underlining or clouding the items to be reviewed (provided for the project) or crossing out the items which are not applicable.
 - 1.9.3.4 Not including actual manufacturer's cut sheets or catalog information of proposed products.
 - 1.9.3.5 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.
- 1.9.4 The Contractor shall make a written request directly to Johnson Consulting Engineers for electronic drawing files (CAD). As a part of the written request, please include the following information:
 - 1.9.4.1 Clearly indicate Project Name and Client, Johnson Consulting Job Number (located in the bottom left corner of JCE Engineering Stamp) and each drawing Sheet Number required (i.e. E1.1, E2.1, E4.1 etc.)
 - 1.9.4.2 Identify the Name, Company, Title, phone number, mailing address and e-mail address of the person to receive the files.
 - 1.9.4.3 Detail or Riser diagram sheet, System Schematic drawings or any other drawings other than floor plans or site plans, will not be made available to the Contractor.
 - 1.9.4.4 Files will only be provided in the AutoCAD format in which they were created (i.e. version 2015 or version 2016). Files will not be made available in REVIT format.
 - 1.9.4.5 Requests for files will be processed as soon as possible; a minimum of (7) working days should be the normal processing time. The Contractor shall be completely responsible for requesting the files in time for their use and delays in requesting files will not alleviate the Contractor from submitting required documents within the required timeline.

PART 2 – PRODUCTS

- 2.1 Equipment racks have been detailed on the drawings and additional component information requirements have been described in the following sections and on the drawings. The following is a list of approved manufacturers for each type of rack to be furnished.
 - 2.1.1 Alternate equipment manufacturers other than those indicated will not be reviewed or approved for use on this project.

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- 2.1.2 **(Open Frame – 4-Post)** shall be manufactured by Chatsworth CPI QuadraRack #50120-703 Series. Reference drawing details and specifications for complete requirements.
- 2.2 **Open Frame 4-Post Racks**, 19" mounting Width by 84" High by 29" Deep with #12-24 mounting holes as shown in the IDF Room layout. Contractor shall be responsible for providing all racks and accessories. Furnish and install with the following:
- 2.2.1 The racks shall be provided with structural seismic bracing using cable runway to the top of the rack.
- 2.2.2 Universal 12" cable runway shall be as manufactured by CPI Model 10250-712. The cable runway shall be furnished with the additional adapters, connectors, support components, bends and offsets and extensions as required to fit the room and layout.
- 2.2.3 Anchor the cable runway to the wall with the appropriate width angle bracket and bolts as manufactured by CPI Model #11421-712.
- 2.2.4 The cable runway shall also be attached to the top of the rack with the appropriate adapter panel. Cable runway shall be directly attached to the 4-Post racks with J-Hooks.
- 2.2.5 Cable runway routed along walls, shall be offset from the wall a minimum of 6" and shall be supported with cantilevered wall mount brackets.
- 2.2.6 Floor mounted racks shall be structurally anchored to the floor with the anchors and bolts.
- 2.2.7 Provide full length vertical wire managers, CPI Double-Sided Narrow Vertical Manager, Part #12096-703, on each side of each rack. Vertical managers between racks may be substituted with the CPI #11729-703 6" wide double-sided manager. Single narrow vertical managers shall be provided on each end of the group of racks.
- 2.2.8 Provide (1) adjustable full depth vented shelf for each 4-Post equipment rack as manufactured by CPI #12700-719.
- 2.2.9 Provide horizontal wire managers between each patch panel or (1) manager per patch panel. Provide (1) spare manager per rack. Provide 2RMU height managers for each 48-Port patch panel and 1RMU height managers for 24-Port patch panels. CPI part #30130-719 and #30139-719.
- 2.2.10 Provide (1) minimum or more where detailed on drawings. Rack mounted surge arrest style power distribution unit per rack. 1 rack unit in height. TrippLite Model #PDUMH15NET2 with (8) NEMA 5-15R outlets, built-in SNMP Ethernet interface and NEMA L5-15P input with 5-20P adapter or approved equal by APC. Provide with minimum 10-foot cord for the PDU.
- 2.2.11 Contractor shall be responsible for neatly routing, storing and connecting the power cords from the PDUs to the electrical outlet or UPS as directed by the District. Power cords shall be dressed separately from the UTP cables or any other low voltage cable and shall be secured to the back of the rack or cable runway with Velcro ties.

- 2.2.12 Furnish grounding to each rack. Each rack shall be provided with a grounding terminal block, #6 Ground wire from the rack to the bus bar and a compression lug on the end of the ground wire at the bus bar. Provide grounding components as manufactured by CPI #40167-001 terminal block and #40162-901 compression lug or approved equal.
- 2.2.13 Provide (1) ground bus bar kit per MDF Room. Ground Bus Bar Kit as manufactured by CPI #40158-012 or approved equal. Ground Bus Bar and all bonding conductors to the bus bar shall be labeled. Grounding conductors shall be routed to the equipment racks, cable runway and electrical panel.

MDF Room Requirements

- 2.3 The Main Distribution Frame (MDF) Room is existing
- 2.4 Provide Fiber Optic Feed Cable Patch Panels – Fiber optic termination equipment (rack mounted), including all associated installation hardware. The equipment must have a sufficient number of ports to connect all fibers in every cable terminated at this location. Provide 25% spare capacity for future wiring requirements, including bulkheads in the fiber patch panel. Provide blank fillers for all used portions of the panel. All fiber feed cables shall be terminated in a single fiber optic patch panel up to 144 strands. Additional strands shall be terminated in the largest size required to continue the remaining fibers.
 - 2.4.1 Contractor shall provide a minimum of 6-feet of slack on the fiber feed cable in the fiber optic patch panel. The first 48” of a tight buffered cable or the first 24” of a loose tube cable shall not be stripped back in the patch panel. Each type of cable shall have a minimum of 24” of stripped slack within the patch panel. Total slack within the patch panel shall not be less than 6-feet in length.
 - 2.4.2 All fiber cables shall be secured to the patch panel with the Kevlar strength members at the manufacturer provided anchor point at the rear of the panel.
 - 2.4.3 All fiber optic feed cables routed to the MDF Room shall be provided with 20-feet of slack for a service loop mounted on the backboard behind the existing racks. Contractor shall provide a 24” diameter wall mounted service loop manager for the fiber optic feed cables as manufactured by Leviton #48900-FR.
- 2.5 Provide High-Definition Monitor Shelf in the existing MDF Room for programming and control of the new IP-Based Paging Server. Provide (1) High-Definition monitor shelf with integrated keyboard and touch pad for 4-post systems. Maximum 1RMU height, pull out shelf with rotatable monitor assembly. Includes 17” LCD monitor with minimum 1920X1080 resolution, with integrated 8-port KVM Switch. Monitor shall be provided with both HDMI and DVI inputs. Middle Atlantic Part # RM-KB-LCD17KVMHD or approved equal. Monitor shall be installed in one of the existing Data MDF Racks. Coordinate the exact location with the District IT Director prior to installation

IDF Location Requirements

- 2.6 The Intermediate Distribution Frame (IDF) Room shall be a secondary wiring and equipment location for the data networking system. The Contractor shall include the following items at this location:
 - 2.6.1 Provide backboard 8'-0” high x ¾” thick, with a minimum 48” width. Refer to the floorplans for the actual layout of the backboard coverage. Plywood mounting backboard shall be flame resistant, painted with fire resistant paint “white” or

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color to match the room finish. Contractor shall provide minimum one side finish grade plywood. Backboard shall be mounted with finish side out, regardless of location of fire rating stamp. Show proof of fire rating stamp to IOR on Inspector prior to installation.

- 2.7 Provide Fiber Optic Feed Cable Patch Panels – Fiber optic termination equipment (rack mounted), including all associated installation hardware. The equipment must have a sufficient number of ports to connect all fibers in every cable terminated at this location. Provide 25% spare capacity for future wiring requirements. Provide blank fillers for all used portions of the panel. All fiber feed cables shall be terminated in a single fiber optic patch panel.
 - 2.7.1 Each IDF location shall be furnished with a minimum 24-Port patch panel, fully loaded with bulkheads. Type of connectors in the bulkheads shall be determined by the type of connectors used for termination of the fiber feed cables.
 - 2.7.2 Contractor shall provide a minimum of 6-feet of slack on the fiber feed cable in the fiber optic patch panel. The first 48" of a tight buffered cable or the first 24" of a loose tube cable shall not be stripped back in the patch panel. Each type of cable shall have a minimum of 24" of stripped slack within the patch panel. Total slack within the patch panel shall not be less than 6-feet in length.
 - 2.7.3 All fiber cables shall be secured to the patch panel with Kevlar strength members at the manufacturer provided anchor point at the rear of the panel.
 - 2.7.4 All fiber optic feed cables routed to the IDF Room shall be provided with 20-feet of slack for a service loop mounted on the backboard behind the rack. Contractor shall provide a 24" diameter wall mounted service loop manager for the fiber optic feed cables as manufactured by Leviton #48900-FR.
- 2.8 Category-6 Modular Patch Panels (rack mounted) with RJ45 style connectors, for terminating all twisted pair cable from each Voice/Data/IP-Page device outlet served from this location. Provide 25% spare capacity for future wiring requirements. All patch panels shall be 24 or 48-ports maximum. Provide cable support bars at the rear of each patch panel. All cable shall be secured to bars with Velcro straps.

IDF UPS Requirements

- 2.9 General UPS Requirements – The Contractor shall coordinate with the Division 26 Contractor to properly locate the power outlet connection for the UPS in the IDF Room or Cabinet. The location shown on the floor plans is diagrammatical and does not give the Division 26 Contractor an exact placement. In addition, all UPSs must be furnished with heavy duty mounting bracket kits. A UPS installed in a wall mounted IDF Cabinet must be furnished with a 2-Post kit that can support the full weight of the unit.
- 2.10 Final location for the UPS, within the equipment racks or IDF locations with multiple racks, must be verified by the District IT Director or District Construction Project Manager prior to the installation of the UPS or the electrical outlet for the UPS.
- 2.11 UPS Requirement for an IDF location being installed at the IDF closet:
 - 2.11.1 Provide with a minimum of (8) 20-amp, 120-volt, non-locking, NEMA 5-15/20R and (1) 30-amp, 120-volt, locking NEMA L6-30R output receptacles.

- 2.11.2 Provide with an input of (1) 30-amp, 120-volt, locking, NEMA L6-30P plug installed on 10'-0" power cord.
- 2.11.3 Provide network interface card – Model SNMPWEBCARD option in UPS. Software shall be included with the UPS.
- 2.11.4 Provide (1) environmental sensor/monitor in each IDF cabinet location. Provide TrippLite Model #ENVIROSENSE monitor unit and connect it to the UPS.
- 2.11.5 Provide TrippLite Model # SMART3000RMLN (or approved equal by APC).

Fiber Optic Patch Cords

- 2.12 Fiber optic patch cords shall be furnished and installed by the Contractor.
- 2.13 All fiber optic patch cords furnished by the Contractor shall match the grade and glass of the fiber optic feed cable installed for the network infrastructure cabling system. The Contractor shall confirm with the District IT Department the type of connector required at the network equipment prior to ordering or installing the patch cords.
- 2.14 Multimode Fiber Optic Patch Cords – Patch cords shall be duplex 50/125um, laser-optimized, OM4 grade multimode optical glass. Fiber optic patch cords shall be furnished with LC connectors at the network switch port end and LC connectors at the fiber optic patch panel end. Fiber patch cords shall be furnished with ceramic ferrules. All Multimode patch cords shall be Aqua (Lt. Blue) in color. Patch cords shall be 6-feet (2-meters) in length. Provide (2) patch cords in the MDF Room and (2) patch cords in the IDF Closet.
- 2.15 Contractor shall be responsible for confirming the network switch connections with the District IT Director prior to ordering or installing the patch cords.

Copper Patch Cords

- 2.16 Copper patch cords shall be furnished and installed by the Contractor.
- 2.17 Provide Category-6 (Patch Panel End) patch cords with pre-molded boot, provide quantity equal to:
 - 2.17.1 Provide 100% of the total Category-6 cable ports provided on the patch panels.
 - 2.17.2 All patch cords to be installed by Contractor. Provide 100% of total copper patch cords required to be (4) feet in length.
- 2.18 Provide Category-6 (Workstation End) patch cords with pre-molded boot provide quantity equal to:
 - 2.18.1 Provide 100% of the total Category-6 cable ports provided on the patch panels.
 - 2.18.2 All patch cords to be installed by Contractor. Provide 100% of total copper patch cords required for data drop locations to be (10) feet in length, unless otherwise noted.
 - 2.18.3 Patch cords installed at WAP (Wireless Access Point) locations IP Camera and IP Intercom locations shall be (2) feet in length.
- 2.19 Requirements for all copper patch cords furnished:

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- 2.19.1 Color of patch cords shall be determined by the color code shown in detail drawings.
- 2.19.2 Patch cords shall as manufactured by Leviton, Commscope, Panduit, Ortronics or Siemon based on the network infrastructure system furnished by the Contractor.
- 2.19.3 Patch cords furnished must be in compliance with the manufacturer's "Channel" warranty requirements. Patch cords not warranted through the selected manufacturer Channel warranty program will not be approved for use with the network infrastructure.
- 2.19.4 Provide all other items as detailed on the drawings.

Campus Indoor/Outdoor Fiber Optic Feed Cable

- 2.20 Provide one continuous fiber optic cable routed from the Main Distribution Frame fiber patch panel to each intermediate Distribution Frame fiber patch panel, and/or other locations as shown on the drawings.
- 2.21 Outdoor Fiber Feed Cable Applications – Fiber optic cable shall be rated for indoor/outdoor riser rated applications. Construction shall consist of, all dielectric, tight buffer with central strength member, flame retardant PVC or PE jacket, rated OFNR, dry water-blocking compound only, and blank fillers are required. Central tube type fiber will not be considered equal.
- 2.22 Fiber optic feed cables for the data infrastructure must be installed as follows:
 - 2.22.1 Provide a total of 12-strands of Multimode OM4-Rated fiber optic glass as shown on the Riser Diagram in the Detail Drawings to the IDF location.
 - 2.22.2 Feed cables shall be clearly defined and labeled for each system. Provide color coding designations with a different color marker for the multimode and/or single mode fiber feed terminations in the fiber patch panels.
 - 2.22.3 Terminate fiber cables with LC-Type connectors.
- 2.23 Cable shall contain one or all types of fibers listed below:
 - 2.23.1 Provide Multimode 50/125-micron fiber optic glass, (minimum OM4 laser-optimized grade) for dual mode operation at 850 nm and 1300 nm wave lengths.
 - 2.23.2 Maximum attenuation at 3.0dB/km @ 850nm and 1.0dB/km @ 1310nm. Minimum 1-gigabit Ethernet distance guarantee of 1110 meters @ 850nm and 600 meters @ 1300nm. Minimum 10-gigabit Ethernet distance guarantee of 550 meters @ 850nm/1300nm. Fiber shall be ISO-TIA OM4 plus rated.
 - 2.23.3 Refer to drawings for cable types required. Refer to acceptable cables section for additional information and approved manufacturers.
- 2.24 Each fiber optic cable shall contain the quantity of strands of optical fibers as detailed on the drawings.

- 2.25 All fibers in a multi-fiber cable shall be fully operational within the required performance characteristics. If any individual fiber does not meet the minimum standards, the entire cable must be replaced, end to end, including connectors, without any additional expense to the customer.
- 2.26 Acceptable cables shall be:
- 2.26.1 Berk-Tek Multimode – GIGALITE 10-XB-OM4+
 - 2.26.2 Commscope Multimode – (All Brands) Systimax LazrSpeed 550 OM4
 - 2.26.3 Superior Essex Multimode – TeraFlex 10G-550-OM4+ (Type P)
 - 2.26.4 General Cable Multimode – Clear Curve OM4+ (Type BM)
 - 2.26.5 Siemon Multimode – XGLO 550 OM4 (Type T501)
- 2.27 Above glass types are an example of product names per manufacturer. Confirm requirements for indoor/outdoor, riser and plenum rated cable with riser drawings and site plans. Part numbers for composite style cable will vary greatly. Confirm part numbers with manufacturer.

Category-6 Station Cable

- 2.28 Contractor shall provide Category-6 UTP cable to each Data, Voice, IP Page, Audio-Visual Data Connection, IP Camera or any other location as indicated on the drawings and specifications. Provide quantity of cables as indicated on the drawings at each location.
- 2.29 Provide one Category-6, 4-pair unshielded twisted pair (UTP) cable from the nearest MDF or IDF location to each RJ45 data outlet port indicated on the drawings. Dual port outlets will require two such cables. Four port outlets will require four cables. Refer to the drawing details for jacket color requirements for each type of connection. Color of cable jacket for each type of connection shall be determined by the drawing details. Confirm color of cable jacket prior to ordering with the District IT Director. Contractor shall be responsible for providing the correct jacket color per the drawings per District Standards.
- 2.30 Unless otherwise shown in drawing details, the color of the Category 6 UTP cables shall be blue, shall be copper wire, individually insulated and color coded.
- 2.31 The cable shall be UL or ETL rated and UL verified in compliance Category-6 EIA/TIA standards. Approved cables for Network Infrastructure System:
- 2.31.1 Commscope (Systimax) – GigaSpeed XL – 1071E Series
 - 2.31.2 Commscope (Uniprise) – CS37R
 - 2.31.3 Superior Essex – NextGain Cat 6eX - #54-246-xA
 - 2.31.4 Berk-Tek – LANMARK 2000 – 10167477
 - 2.31.5 General Cable – GigaSpeed 6500 71339XX–
 - 2.31.6 Siemon – 9C6R4-E4-XX-RBA

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- 2.32 Where data cables are indicated to run underground, Contractor shall use a Category-6 OSP-rated cable. Approved cables for Network Infrastructure System: Commscope #CS340 OSP-Rated with black PE jacket (or Cat-6 OSP-Rated versions by the Approved Manufacturers)
- 2.33 Manufacturer names and part numbers are shown as a point of reference and do not specifically designate required packaging or color for the cable. Contractor shall verify colors and packaging options shall be determined by Contractor preferences.

Category-6 Outlets

- 2.34 Unshielded twisted pair Category-6 outlets shall be an RJ45 Enhanced performance type 8-position / 8-conductor modular jacks and shall comply with Category-6 performance requirements. Provide single port, dual port, four port or quantity as indicated on the floor plans at each outlet location. All outlets shall be wired in an EIA/TIA 568B configuration.
- 2.35 Provide Category-6 insert installation kits for all locations furnished with Category-6 UTP cabling.
- 2.36 Refer to the detail drawings for color of the Category-6 outlets required. Contractor shall be responsible for confirming all color requirements prior to ordering or installing.
- 2.37 Provide the following Category-6 UTP data connector per Network infrastructure warranty requirements:
 - 2.37.1 Leviton eXtreme Cat6+ Quick Port Series 61110-R
 - 2.37.2 Systimax (Commscope) GigaSpeed XL Series MGS400
 - 2.37.3 Uniprise (Commscope) UNJ 600 Series UNJ600
 - 2.37.4 Ortronics Clarity 6 Tracjack Series OR-TJ600
 - 2.37.5 Panduit MiniCom TX6 Plus Series CJ688TG
 - 2.37.6 Siemon MAX-6 Series MX6-F

Outlet Faceplates

- 2.38 Provide a two-port faceplate for all one and two-port outlet locations. Provide blanks for all unused openings.
- 2.39 Provide a four-port faceplate for all three and four port outlet locations. Provide blanks for all unused openings.
- 2.40 All fax/modem locations shall be provided as single port outlets. Requirements shall be the same as a single port data outlet as shown on the Technology Legend.
- 2.41 For single port voice outlet locations intended for wall telephone connections, a wall telephone type faceplate with attachment studs shall be provided. The wall telephone jack shall be 8-pin, RJ45 type and use IDC wire terminations only. Provide Category-6 insert, within stainless steel wall plate faceplate. Provide faceplate from the approved manufacturers listed in the specifications.

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- 2.42 Provide single port or dual port small surface mounted outlet box for IP Speaker data outlets. Provide surface mount box by Leviton QuickPort Series 41089-xxx or equal by one of the approved manufacturers listed in the specifications. Provide surface box for all IP Speaker data locations mounted in the backcan for the speaker as shown in the detail drawings.
- 2.43 Provide single port or dual port small surface mounted outlet box for IP Camera data outlets inside the J-Box for the camera location. Provide surface mount box by Leviton QuickPort Series 41089-xxx or equal by one of the approved manufacturers listed in the specifications. The location shall also be furnished with a blank weather-tight faceplate to protect the data termination until the cameras are installed.
- 2.44 All faceplates and surface mount outlet boxes shall be furnished with label windows. All labeling shall be installed within the label window.
- 2.45 Confirm color of all faceplates prior to ordering. All data outlet faceplates shall have a unique sequential identification number in the label window of the faceplate. Hand-written labels are not permitted. All color schemes shall be approved by the customer prior to installation.
- 2.46 Colored inserts are required for this project. Refer to the detail drawings for the exact color scheme to be provided. Inserts submitted that do not follow the color and identification requirements will be rejected. Inserts installed that do not follow the color coding as shown in the detail drawings will be replaced at the Contractor's expense.
- 2.47 All labels will be installed under label window. Labels adhered to the surface of the faceplate will not be accepted. Contractor must provide clear laminating type of cover material over the surface mounted labels where used.
- 2.48 Reference the drawings for special outlet configurations or plate requirements.

PART 3 – IP PAGING REQUIREMENTS

- 3.1 The Contractor shall furnish and install all IP-based speakers, horns, all associated hardware and software.
- 3.2 Data Contractor shall be responsible for furnishing enclosures for all IP-based speakers and horns. Contractor shall provide vandal-resistant screws with all enclosures for attachment of the speaker grill or exterior horn baffle. Exterior horn locations shall be provided with stainless steel vandal resistant screws and baffle. Provide (2) tools with the project for removal of the vandal-resistant hardware, delivered to the District IT Department.
- 3.3 All surface mounted enclosures shall be furnished and installed by the 27 10 00 Contractor in all areas shown in the floor plans including exterior surface mounted enclosures.
- 3.4 Recessed flush mount enclosures shall be furnished by the 27 10 00 Contractor and installed by the Division 26 Contractor, unless otherwise noted on the Legend or Floor Plans. Recessed enclosures shall be furnished with manufacturer provided “wing” bracket panels that attach to the side of the enclosure and shall be used for attachment to the structural members. The 271000 Contractor must procure and deliver the recessed enclosures to the Division 26 Contractor during the rough-in phase of the project.

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- 3.5 IP-Based paging speakers, horns and associated enclosures shall be as manufactured by Atlas/IED IPX-Series.
- 3.6 Provide IP-Based Paging Speakers and Horns for the following types of locations as shown on the drawing floor plans and legend:
 - 3.6.1 Interior POE+ surface mounted IP-Based Speaker with microphone, Atlas/IED Part #IP-SM - provide surface mount angled speaker enclosure Part #IP-SEA-SD in white finish.
 - 3.6.2 Interior POE+ recessed IP-Based Speaker with microphone, Atlas/IED Part #IP-SM - provide recessed flush straight speaker enclosure Part #IP-FEST-SD.
 - 3.6.2.1 IP-Based speaker flush mounted in a non-accessible (Hard Lid) ceiling space shall be secured to the structure above with a single 12-AWG support wire attached to the recessed enclosure. Contractor shall field modify the enclosure to allow for connection of the support wire.
 - 3.6.3 Interior POE+ IP-Based 1-foot by 2-foot drop-in type Speaker with microphone in an accessible ceiling, Atlas/IED Part #IP-12SYSM. Speaker shall be provided with integrated enclosure. Speaker shall include T-bar attachment for cut-in location in accessible ceiling.
 - 3.6.3.1 IP-Based speaker in accessible ceiling shall be secured to the structure above with a single 12-AWG support wire attached to the backcan of the speaker. Contractor shall field modify the backcan to allow for connection of the support wire.
 - 3.6.4 Exterior POE+ vandal and weather resistant surface mounted IP-Based Page Horn Atlas/IED Part #IP-HVP - provide weather resistant, stainless steel surface mount straight enclosure Part #IP-SEST-HVP finished with white textured epoxy. Exterior Page Horn shall be furnished with a powder coated aluminum grill and vandal resistant zinc plated steel baffle. Grill and baffle shall be included with page horn.
 - 3.6.5 Exterior POE+ vandal and weather resistant recessed IP-Based Page Horn Atlas/IED Part #IP-HVP - provide recessed stainless-steel straight enclosure Part #IP-FEST-HVP with mounting wings. Exterior Page Horn shall be furnished with a powder coated aluminum grill and vandal resistant zinc plated steel baffle. Grill and baffle shall be included with page horn.
 - 3.6.6 Provide a 2-foot long, CAT-6, UTP patch cord, for the speaker/horn location to connect to the data drop located in the enclosure, color of patch cord per District IT Department instructions. Provide patch cords for 100% of IP-based paging speaker and horn locations. Provide (10) spare patch cords delivered to the District IT Department.
 - 3.6.7 IP speakers/horns shall be connected to a POE port on a network switch in the MDF / IDF Room or Cabinet. Coordinate the connection of the POE powered devices with the District IT Department. IP-Based Speakers/Horns must be patched to a POE powered switch to allow for proper operation.

- 3.6.8 All speaker/horn connections to be terminated at the data patch panel and identified with a colored insert or color tabbed label, per the District Standards, or as shown in the detail drawings and the specifications.

IP-Based Paging Software and Server

- 3.7 Contractor shall furnish and install the software and server for the IP-Based Paging system.
- 3.8 Provide IP-Based Paging software for the project. The software shall be loaded on the Contractor furnished server. Contractor shall provide all programming for the paging announcements, pre-recorded emergency announcements and pass class bell notifications. Coordinate the pass class bell schedules and desired paging tone to be used with the District IT Department and the Site Principal. Software shall be as manufactured by Atlas/SingleWire "Informacast Advanced" software platform. Provide latest version of software available at the time of installation.
- 3.9 Contractor shall interface the IP-Paging software with the District's VoIP call management software program on the existing Mitel VoIP Telephone System. Provide all programming information required to allow the District to set the parameters for access to the existing call management software. Coordinate with the District IT Department for access to the programming interface with the existing VoIP Telephone System. Contractor shall program system to allow page zone calling from the VoIP telephone sets. Access codes for the paging application shall be selected by the District.
- 3.10 Contractor is responsible for providing all licensing requirements and software updates (as required to bring product up to date) to drive the speakers, horns, program tones, bell schedules and announcement controls. Speakers and Horns shall be furnished with "Lifetime" licenses in the project bid. Annual license fees are not an acceptable alternative.
- 3.11 Programming of speakers and horns for page coverage zones, tones, time schedules, pass class bells, pre-recorded emergency announcements and VoIP interface to be completed by the Contractor. The District will be responsible for providing IP addressing to the Contractor for the network to identify all system IP devices.
- 3.12 Contractor's responsible for providing MAC addressing and identification of individual speakers and horns or any other IP based device in the system. Provide a spreadsheet list to the District IT Department of all devices with the MAC addresses, locations, page zone, speaker/horn type and Room Number.
- 3.13 Contractor to provide a minimum of 6-hours of meeting time with the District to confirm all programming requirements. The Contractor shall provide Meeting Minutes and proposed bell schedules, access control codes, pre-recorded message requirements and proposed bell tones to the District and the Project Engineer for approval. Contractor shall not program system until programming proposals have been approved.
- 3.14 Provide rack mounted server in the existing MDF Room in Building 'C' for the new IP Paging software control. Provide server with the following minimum requirements:
- 3.14.1 Provide Dell Poweredge R340 rack mount server or approved equal. Minimum server configuration: Intel Xeon E-2124 3.3Ghz, 8M Cache, Turbo, 4-Core/4-Thread, 71 W processor; 16GB 2666MT/s DDR4 ECC UDIMM, Memory; 64 Bit Windows Server 2019 Essentials Edition OS; Microsoft IIS; Microsoft.NET 4.5; On Board Broadcom 5720 Dual Port 1 GB LOM Ethernet Interface; 1TB 7.2K

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RPM Sata 6Gbps 512N 3.5 "Hot Plug Hard Drive; 3.4" Chassis for up to (4) Hot plug hard drives: Dual Hot Plug 350W redundant power supplies; Nema 5-15P, 15-amp, 10-foot power cord; "Ready Rails" static mounting rails for 2 or 4 Post Rack; DVD +/-RW Sata internal drive; USB keyboard and Optical Mouse.

- 3.14.2 Provide optional Video Card with HDMI port in the Server for connection to the Monitor/KVM switch in the MDF Rack. Provide (1) HDMI patch cable, length as required, to make the connection.
- 3.14.3 Contractor shall receive written confirmation of the server requirements with the District IT Director prior to ordering. Approval of the project submittals does not provide the Contractor approval of server for ordering purposes. Final server configuration shall be approved in writing with a copy submitted to the Construction Manager and Project Engineer. Upgrades to the Server configuration that are not included in the bid specifications shall be clearly outlined in the submittal along with any additional costs for the upgrades.
- 3.15 Contractor shall furnish and install the server in the MDF Room existing data racks or at an alternate location designated by the District IT Department. Connect the server to the School's LAN network switch as designated by the District. Coordinate the installation and set-up with the District IT Department and the local IT support personnel.

PART 4 – VIDEO SURVEILLANCE REQUIREMENTS

- 4.1 Provide (2) Category-6 UTP cables from the IDF closet to each camera location. All cables installed in underground conduit shall be rated for Wet Location. The cables shall be terminated in the junction box on a surface mount box. The camera locations shall be provided with a weatherproof grommited stainless steel faceplate for future use. Label the faceplates on the inside with an adhesive label so the labels won't fall off.

PART 5 – WIRELESS ACCESS POINTS (WAP) REQUIREMENTS

- 5.1 The District will provide all Wireless Access Point units and programming will be by the District IT Department. The Contractor shall install each Wireless Access Point as required and provide patch cord installation at the WAP. The Contractor shall provide a list including the room number, location, and MAC address of each device installed to the District IT Department. Provide minimum 10' slack cable at each WAP location stored above the WAP location on J-Hooks as shown in the detail drawings.
- 5.2 Refer to drawing details for installation requirements for WAP locations. The Contractor shall furnish and install all mounting brackets for the WAP locations in the accessible ceiling and for the wall mounted locations.
- 5.3 Contractor shall install the Exterior WAP units at the locations shown on the drawings. Coordinate with the District IT Department for all mounting brackets and connection of all WAPs.

PART 6 – INSTALLATION

- 6.1 Upon completion of 10% of the cabling installation, the Contractor shall notify the Project Engineer for an inspection of the methods and types of materials used on the project. The Contractor shall give a minimum of 72 hours notification to the Project Engineer for the scheduling of the inspection. The Contractor will be given a written review of the findings, so if adjustments are required, they can be done before the project proceeds.

The Contractor shall be responsible for adhering to the findings and a follow-up inspection will not be provided.

- 6.2 Pull strings shall be provided with all cable runs including but not limited to: conduit stub ups, conduit sleeves, cable trays, open wiring routes, innerduct and point-to-point conduits. Pull strings shall be free from cable bundles in open wiring routes. Pull strings shall not be substituted for pull ropes for the exterior site conduits.
- 6.3 Velcro cable management straps are required on all Category-6 cable bundles, the last 20 feet or upon entry into equipment closet, a maximum of 12" apart. Cable bundles shall also be routed through cable managements or "D" rings in the equipment closet.
- 6.4 Data Contractor shall supply protective bushings or slide on rings at the ends of all exposed conduits used for data system cabling. This is to include all conduits installed for any future data cabling requirements. Contractor shall submit planned protection bushings prior to installation of cabling for approval.
- 6.5 Velcro cable management straps are required on the cabling in the rear section of the vertical managers in the equipment racks. Straps shall be a maximum of 12" apart. At a minimum, Velcro straps shall be provided at each point the cables are routed to the patch panels from the main bundle.
- 6.6 Every fiber in every fiber optic cable must be terminated at both ends of a fiber patch panel in the MDF/IDF closet or cabinet location. Termination shall be accomplished using the correct style of connectors as directed by the specifications with a strain relief boot. All connectors shall be of the same manufacture to ensure compatibility. Polarity of fiber strands must be observed at all times.
- 6.7 Labeling
 - 6.7.1 Each cable run shall be permanently labeled at each end with a unique sequential number which corresponds to a similar number provided for each data outlet and patch panel point. A printed label shall be placed at each of the following locations:
 - 6.7.1.1 On the cable at the rear of the patch panel or termination block. Requires the use of a self-laminating wrap around label. Brady Label self-laminating 1.2" by 1.5" wrap around label Part #29689 (NO ACCEPTALE EQUAL).
 - 6.7.1.2 On each cable in the j-box behind the faceplate location. Requires the use of a self-laminating wrap around label. Brady Label self-laminating 1.2" by 1.5" wrap around label Part #29689 (NO ACCEPTALE EQUAL).
 - 6.7.1.3 On the cable at the terminal strip prior to termination point. Requires the use of a self-laminating wrap around label. Brady Label self-laminating 1.2" by 1.5" wrap around label Part #29689 (NO ACCEPTALE EQUAL).
 - 6.7.1.4 On the face of the patch panel, provide a 3/4" by 3/4" label with a letter or number identifying the patch panel designation. For special purpose data connections such as WAP, Audio-Visual, IP Page and IP Camera ports, the label shall be designated with colored label icon or marker.
 - 6.7.1.5 On the face of the faceplate in the label holder window. The label shall be clearly defined with a minimum #10 font size.

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- 6.7.2 Handwritten labels are not permitted. Where cable ID includes room number identification, the Contractor shall obtain written verification of final room numbers prior to beginning labeling (numbers on plans do not always match final room numbers). Cable pulling cross reference lists will not be accepted with final documentation.
- 6.7.3 Each patch panel port shall be identified with a unique sequential labeling scheme. Port identification labeling pattern shall be consistent throughout the project.
- 6.7.4 All faceplates shall be identified with permanent printed labels. Labels must not be subject to removal by incidental contact. Contractor shall be responsible for replacing defective labeling for a period of one year from date of final sign-off of project.
- 6.7.5 All fiber optic and UTP feed cables shall be identified with permanent, water resistant, printed labels. Labeling information shall include closet identifications, quantity of conductors (UTP) or strands (fiber) and house pair designations (UTP). Cables shall be labeled in the IDF/MDF closets at the site conduit entrance point, riser conduit entrance point and prior to entering either punch blocks or patch panels. Labels for fiber and copper feeds shall include both the name of the origination point and the destination point, house pair or house fiber strand count, cable composition (i.e., 12-Strand MM 50/125 LO; 6-Strand SM). See details for additional requirements.
- 6.7.6 Labeling will follow recommended EIA/TIA standards or as requested by the customer. Contractor will confirm labeling pattern prior to final identification or testing. All test results will be identified by the final labeling scheme. Contractor shall be required to have the labeling scheme approved in writing by the District IT Director prior to manufacture or installation of the labeling.
- 6.7.7 All fiber optic cables and/or innerduct shall be tagged with fiber optic warning tags in every manhole or pullbox. Fiber warning tags shall also be placed at each end of the cable in the termination closets in clear view. A minimum of (3) tags are required at each end, with a label tag on each cable in the service loop. Fiber warning tags shall be placed on fiber optic cable and/or innerduct routed through open ceiling environments at increments no less than 15 feet apart.
- 6.7.8 Refer to detail drawings for additional labeling requirements.
- 6.8 Where open wiring cables are run through the ceiling space (only permitted where specifically noted on the drawings), the wire shall be bundled together and supported above the ceiling.
- 6.9 All cables must be fastened to the building structure via "j-hooks" or an approved Category 6 suspension system, and not directly in contact with ceiling system. For "j-hooks" maximum fill capacity is as follows: 1-5/16" hooks – 35 cables; 2" hooks – 60 cables; 4" hooks – 120 cables. For quantities beyond 120 cables, use a sling support system such as "Erico Cable Cat" or equal. Maximum fill capacity 200 cables. D-rings, "Caddy #VMMX cable hangar", "Caddy Bridle Rings", drive rings or any other type of wire ring support is not allowed.
- 6.10 Where cables pass through a fire-resistant portion of the structure, conduit sleeves shall be provided to maintain the rating of wall penetrated. Sealing of all penetrations with an

approved fire barrier is required. Conduits and sleeves must remain accessible for future use. Permanent sealants may not be used to seal sleeves and conduits.

- 6.10.1 The 27 10 00 Contractor shall be responsible for fire-stopping all unused conduit sleeves in the ceiling or through rated walls. The Electrical Contractor shall be responsible for fire-stopping around the conduit or sleeve, unless the sleeve is installed by the 27 10 00 Contractor, in which case, the 27 10 00 Contractor shall be responsible for all fire-stopping requirements.
- 6.10.2 Expanding foam is not an acceptable sealant for any conduit opening. Contractor shall be responsible for complete replacement of the conduit and cabling in any conduit filled with expanding foam used as a sealant.
- 6.11 Fiber optic feed cables connecting to equipment racks from the MDF Room or from an adjacent IDF location, shall be installed with not less than a 20-foot service loop between the rack and mounted on the backboard. See drawings for fiber optic service loop requirements.
- 6.12 Provide 6 inches of cable slack at computer data system outlets inside conduit box.
- 6.13 In an accessible ceiling area, provide a 10-foot (stored in a Figure-8 configuration) service loop above the all data/voice outlet locations. Service loop must be securely tied up off of ceiling tiles or ceiling surface and supported at two opposite points. Neatly coil cable without exceeding minimum bend radius limitations. Do not provide length in excess of 15 feet, as it may cause improper test results and errors.
- 6.14 Do not provide a service loop in the MDF/IDF Room on the UTP cables, unless otherwise noted. Cables shall be neatly routed around the perimeter of the room to the cable runway from the point of entrance into the room.
- 6.15 The minimum bending radius for all cables and the maximum pulling tension shall not exceed manufacturer's recommendations.
- 6.16 Cables installed in manholes and pullboxes shall be supported with Velcro ties or loosely fitted UV rated tie wraps, on wall mounted cable support racks. The cables shall be clearly labeled in the manhole or pullbox.
- 6.17 Provide a full 360-degree loop of slack cable around manhole and pullbox interiors. Cables entering handholes from the bottom, shall not be allowed to touch the bottom of the cover when closed and shall not be pinched or crushed in any way.
- 6.18 Cable pulling shall use a split mesh grip over the cable jacket. Connection directly to optical fibers and copper wire conductors shall not occur.
- 6.19 When pulled through conduits, cable pulling lubricants shall be continuously applied to all cables and be specifically approved by the manufacturer.
- 6.20 Where cables are pulled through or pulled from a center run, pull without splices or terminations, lead out the cables at all manholes, pullboxes, and conduits, taking care to feed them in again by hand for the next run.
- 6.21 For each cable pull where a cable direction change is required, flexible feed-in tubes, pullout devices, multi-segmented sheaves, etc., shall be used to ensure proper cable pulling tension and side wall pressures. Cables shall not be pulled directly around a short right-angle bend. Any device or surface the cable comes in contact with when under pull-

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in tension shall have a minimum radius 50% greater than the final specified minimum installed cable bending radius. The maximum possible size radius sheaves and feed-in tubes, usable in the available working space shall be provided in all situations, to ensure the minimum possible cable sidewall pulling pressure. Do not use devices with multi-segment "roller" type sheaves.

- 6.22 Cable lengths over 250 feet shall be machine pulled, not hand pulled. Cables shall be pulled in a continuous, smooth operation without jerking or stop-start motion after initiation of pull. Maximum cable pulling speed shall be less than 50 feet per minute. Minimum pulling speed shall be greater than 15 feet per minute.
- 6.23 A pull string shall be placed with all UTP and paging station cables at the time of installation. Conduit runs and surface raceway for station cabling shall be furnished with a minimum 2-Ply spiral wrap style, pull string rated for 240 ft/lbs. pulling strength, such as manufactured by Greelee #431 or approved equal. Includes all conduit stubs and cables routed through open ceiling and cable trays. Pull strings shall be tied off in the junction box and in the ceiling. Provision for the installation of the pulls string shall apply to all empty and spare conduits as well. Single ply type pull string will not be accepted as a substitute for the 2-ply pull string.
- 6.24 A measuring pull tape shall be placed with all feed cables at the time of installation. Indoor riser and outdoor conduit runs between buildings designated for feed cabling, in excess of 150 feet shall be provided with a minimum ½" polyaramid style, measuring true tape pull string annotated with footage increments rated for 2500 ft/lbs. pulling strength, such as manufactured by Greenlee #39245 or approved equal. Conduit runs less than 150 feet shall be furnished with a ¼" polyaramid style, measuring true tape pull string annotated with footage increments rated for 1250 ft/lbs. pulling strength, such as manufactured by Greenlee #39243 or approved equal. Provision for the installation of the measuring pull tape shall apply to all empty and spare conduits as well. Standard twine style pull strings and standard nylon or polypropylene style pull ropes will not be accepted as a substitute for the polyaramid measuring tape pull string.
- 6.25 When pulling cable through conduit, cables shall be pulled straight into or out of the raceway without bends at the raceway entrance or exit. Pull in cable from the end having the sharpest bend (i.e., bend shall be closest to the reel). Keep pulling tension to minimum by liberal use of lubricant, hand turning of reel, and slack feeding of cable into duct entrance. Employ not less than one man at reel and one at manhole or pullbox during this operation. Cables shall be pulled directly from cable reels.
- 6.26 All cables shall be new and extend continuous from each MDF or IDF backboard or rack to all outlet locations.
- 6.27 Where cables are not installed in a conduit or other raceway system, they shall not be routed parallel with other line voltage equipment or wiring (120 volt and above) with 36" or within 12" of line voltage equipment or wiring where crossing.
- 6.28 Where OSP-Rated UTP cables or OSP-Rated fiber optic cables are routed exposed through ceiling for more than 50'-0", Contractor shall install the cable in innerduct or EMT conduit in the ceiling. Innerduct installed in the accessible ceiling space shall be a minimum of riser rated and minimum of 1" in diameter. Innerduct shall be supported minimum of every 3-feet to the structural members.

TESTING

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- 6.29 All Category-6 cables shall be point to point (link) tested after installation/termination and verified to operate at minimum 1000Mbps. Performance of installed cables shall satisfy all current addendums to the EIA/TIA 568A standard for Category-6 wiring. In addition, testing shall satisfy all proposed amendments to the existing ISO/IEC requirements. The wiring shall support all specified communication protocols. Testing shall support the Category-6 requirements by the EIA/TIA.
- 6.30 Upon completion of testing cable links for both copper and fiber optic cabling, the Contractor shall supply a copy of the original database files downloaded from the tester in original format on a USB Flash Drive. Contractor shall provide with the testing database files, an original copy of the tester's manufacturer software program (included in original cost) for record management and archiving, in a Windows format (i.e., Fluke Linkware software program).
- 6.30.1 The manufacturer's software program will be used by the Project Engineer to review all test results, and then turned over to the District to keep as their record copy with the final approved test results. Provide (3) copies of tests on USB Flash Drives. Do not submit test results for review in Excel or PDF file formats, as the submittal will be rejected and not reviewed.
- 6.31 Contractor will repair or replace cable runs or connecting hardware that do not meet specified criteria.
- 6.32 Multimode fiber optic cables shall be tested bi-directionally at 850nm and 1300nm. All fiber strands shall be tested with an OTDR (Optical Time Domain Reflectometer). All fiber test results shall contain final source and destination information that matches IDF or MDF labeling shown on the fiber optic patch panels and final documentation. OTDR tests results shall be included with the copper test results and submitted with the tester's software for review. Do not submit test results for review in Excel or PDF file formats, as the submittal will be rejected and not reviewed.
- 6.33 Test procedures shall comply with EIA/TIA 526-14 Method B. Test results shall meet the minimum following criteria:
- 6.33.1 Fiber optic test results shall not exceed 2db total attenuation loss in addition to inherent loss published by manufacturer tested at minimum 2000 Mhz for 805nm and 500 Mhz for 1300nm for the fiber optic cable.
- 6.34 End to end attenuation Fiber Optic feed cabling testing shall be performed with a temporary test jumper cable at each end of the installed fiber cable. The test jumper utilized shall be the same fiber core size and grade of glass as the installed cable. The measured attenuation of the test jumpers, test connectors, and test interconnection sleeve between the two test jumpers shall be less than 1dB as calibrated at the time of the test at indicated wave lengths and frequencies. Test jumpers shall be "zeroed out" before testing of fiber stands begins.
- 6.35 Final As-Built Drawing Submittals – Provide (1) hard bound copy of "E-size" As-Built drawings and (3) copies on USB Flash Drive in AutoCad (2014 or newer version) format. A Hand marked-up copy of the original construction drawings will not be accepted as the final As-Built drawing submittal. Final As-Built drawings shall include copies of the floor plan drawings of each building, detailed elevations of each MDF or IDF locating all equipment, quantities outlets and speaker locations, locations of all sleeves and identification of all final cable routes. In addition, the drawings shall include all outlet locations with cable identification numbers.

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END OF SECTION

28 00 00

ELECTRONIC SAFETY & SECURITY

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SECTION 28 01 00

ELECTRONIC SAFETY AND SECURITY GENERAL PROVISIONS

ARTICLE 1 - SUMMARY

- 1.1 This Division of the specifications outlines the provisions of the contract work to be performed as a sub contract under the Division 26 scope of work. Reference the Division 26 Electrical General Provisions for scope of work and general requirements.
- 1.2 In addition, work in this Division is governed by the provisions of the bidding requirements, contract forms, general conditions and all sections under Division 1 requirements.

END OF SECTION

SECTION 28 30 01

FIRE ALARM VOICE EVACUATION SYSTEM

PART 1 – GENERAL

- 1.1 Work Included:
 - 1.1.1 Furnish and install all equipment, accessories, and materials in accordance with these specifications and drawings to provide a complete and operating fire alarm system.
- 1.2 Related Work:
 - 1.2.1 Division 26 01 00: Electrical General Provisions
 - 1.2.2 Division 26 05 33: Conduit and Fittings
 - 1.2.3 Division 26 05 34: Outlet and Junction Boxes
- 1.3 The equipment and installation shall comply with the current applicable provisions of the following standards:
 - NFPA 72-2016. National Fire Alarm Code with California Amendments.
 - CBC - 2016. California Building Code (CBC), Part 2, Title 24, CCR.
 - CEC - 2016. California Electrical Code, (CEC), Part 3, Title 24, CCR.
 - CFC - 2016. California Fire Code (CFC), Part 9, Title 24, CCR.
- 1.4 The system and all components shall be listed by Underwriters Laboratories, Inc. for use in Fire Protective Signaling Systems under the following standards as applicable:
 - UL 38 Manually Actuated Signaling Boxes.
 - UL 50 Cabinets and Boxes.
 - UL 268 Smoke Detectors for Fire Protective Signaling Systems.
 - UL 268A Smoke Detectors for Duct Applications
 - UL 346 Waterflow Indicators for Fire Protective Signaling Systems.
 - UL 464 Audible Signaling Appliances.
 - UL 521. Heat Detectors for Fire Protective Signaling Systems.
 - UL 864 Control Units for Fire Protective Signaling Systems.
 - UL 1481. Power supplies for Fire Protective Signaling Systems.
 - UL 1971. Visual Signaling Appliances.
- 1.5 Only Fire Alarm Control Panel Equipment and Peripheral Field Devices have been shown on the Contract Bid Single Line Block Diagram. Specific and complete wiring between Control Equipment and Peripheral Equipment has been deleted for clarity.
- 1.6 Submittal shall be made **in accordance with Division 26 01 00 – Shop Drawings and Submittals.** This submittal shall include the following:
 - 1.6.1 Complete bills of quantities, including all materials, components, devices, wiring and equipment required for this work. The bills of quantities shall be tabulated respective of each and every system as specified, and shall contain the following information for each item listed:
 - 1.6.1.1 Quantity of each type of equipment item.
 - 1.6.1.2 Quantities of 10% spare devices as per 1.16.
 - 1.6.1.3 Description of each item.

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- 1.6.1.4 Manufacturer's Name and Model Number.
 - 1.6.1.5 Manufacturer's Specification Sheet.
 - 1.6.1.6 Back box type and dimensions per device type.
 - 1.6.1.7 California State Fire Marshall Listing Sheets for all components.
 - 1.6.1.8 Equipment items which have individual components, will require that all component parts be listed individually.
 - 1.6.1.9 Letter indicating the contractor's intent to comply with Phase II submittal drawings.
- 1.7 Phase II Submittal shall be provided **within (20) working days** after the approval of the Phase I submittals and prior to any fabrication or field conduit installations. All shop drawings shall be engineered and drawn on a CAD System. Each submission shall include 'D' or 'E' size print copies to match the contract drawings, and one (1) data disk copy with files in an AutoCAD 2000i or 2004 format. Building floor plan CAD files on disk, will be made available via express mail **after the receipt of payment** of \$50.00 per building floor plan, or \$300.00 minimum which ever is **less**. Contractor shall make the request for drawings in writing directly to Johnson Consulting Engineers, confirmation of the request and a release form will be forwarded to the contractor to include a signed copy with payment prior to release of files. Detail or riser diagram sheets or any other drawings other than floor or site plans, will not be made available to the contractor.
- 1.7.1 **Provide complete shop drawings to include the following:**
- 1.7.1.1 Complete floor plans, at scale of contract documents, showing the locations throughout the project of all devices, panels conduits, wireways, tray, pullboxes, junction boxes, number and type of conductors, and other devices.
 - 1.7.1.2 Point to point wiring diagrams showing wiring from panel terminals to each device.
 - 1.7.1.3 Riser diagram indicating all wiring and circuits.
 - 1.7.1.4 Current State Fire Marshal listing sheets for all components and devices.
 - 1.7.1.5 Provide battery power supply calculations, indicate point of power supply connection, means of disconnect, over-current protection, etc. for each panel.
 - 1.7.1.6 Provide detailed information on conductors to be used-manufacturer, type, size, insulation, etc.
 - 1.7.1.7 Provide voltage drop calculations for all conductor run is from each panel (i.e., main FACP, remotes, power extenders, etc.) for each panel.
 - 1.7.1.8 Provide written sequence of system operation matrix.
 - 1.7.1.9 Provide list of zones. (Every device that is addressable.)
 - 1.7.1.10 Provide detailed drawing for annunciator panel indicating all zones and initiating devices.
- 1.8 **Common submittal mistakes which will result in submittals being rejected:**

- 1.8.1 Not including the qualifications of the installing contractor.
- 1.8.2 Not including all items listed in the above itemized description.
- 1.8.3 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.
- 1.8.4 Not including actual manufacturer's catalog information of proposed products.
- 1.8.5 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.
- 1.9 All equipment and material shall be new and unused, and listed by Underwriter's Laboratories for the specific intended purpose. All control panel components and field peripherals shall be designed for continuous duty without degradation of function or performance. All equipment covered by this specification or noted on Installation. Drawings shall be equipment suited for the application and shall be provided by a single manufacturer or be recognized and UL listed as compatible by both manufacturers.
- 1.10 It will be the responsibility of the Contractor to ensure proper specification adherence for system operation, final connection, test, turnover, warranty compliance, and after-market service. The distributor of the equipment specified must be factory-trained and certified.
- 1.11 Basic System Functional Operation, upon operation of any automatic, manual or other initiation device the following shall occur:
 - 1.11.1 The system alarm LED shall flash.
 - 1.11.2 A local piezo electric signal in the control panel shall sound.
 - 1.11.3 A backlit 80-character LCD display shall indicate all information associated with the fire alarm condition, including the alarm point and its location within the protected premises.
 - 1.11.4 History storage equipment shall log the information associated with each new fire alarm control panel condition, along with time and date of occurrence.
 - 1.11.5 All system output programs assigned via control by event equations to be activated by the particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.
 - 1.11.6 LED display and audible signaling at the remote annunciator indicating building, fire zone, and type of device. Annunciator shall also provide a separate audible signal for CO detection with a green flashing light, with classroom number indication.
 - 1.11.7 Automatic retransmission to a UL central station for fire department notification.
 - 1.11.8 Automatic shut down of air conditioning units shall be performed by control modules at each unit when required as part of a complete area coverage design scheme. Each building shall shut down all A/C units and dampers within that building as one zone.

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- 1.12 All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approval agency for use as part of a protective signaling system.
- 1.13 All equipment and components shall be installed in strict compliance with manufacturer's recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.
- 1.14 All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place. Fasteners and supports shall be adequate to support the required load.
- 1.15 All wiring shall be installed in a conduit system.
- 1.16 The contractor shall provide as a part of this contract additional control modules, heat detectors, smoke detectors, CO detector, duct detectors, manual pull stations, strobes, speakers, speaker/strobes exterior speakers devices etc. along with all required programming, to equal 10% of the total quantity of devices shown on the drawings, or a minimum of three (3) for each type, whichever is greater. Installation of 50' of conduit, boxes and all wiring for each of the devices shall be included, and required locations coordinated with CSFM final approved shop drawings. Any devices not required to be included during construction shall be delivered to the District at the completion of the project. The quantities of these devices shall be listed as a part of the Phase I submittals.
- 1.17 The installing contractor shall provide a copy of current documentation, indicating that the contractor installing the fire alarm systems or devices and wiring, is certified by Underwriters Laboratories (UL) in its product directories under the listing category "PROTECTIVE SIGNALING SERVICES - LOCAL, AUXILIARY, REMOTE STATION, AND PROPRIETARY." The contractor shall be certified by the manufacturer to install and program the system. The contractor must also provide complete installation of all wiring and equipment, and software programming. Supervised installation of the wiring, devices and/or any software programming shall not be permitted.
 - 1.17.1 The installing contractor must also be an "authorized dealer" by the equipment manufacturer and must have completed all required training prior to the bid of this project.
 - 1.17.2 The fire alarm system installation shall be warranted by the manufacturer's representative.
 - 1.17.3 The Contractor shall have a current California C-10 or C-7 Contractor's License, and all individuals working on this project shall have passed the Department of Industrial Relations Division of Apprenticeship Standards – "Fire / Life Safety Certification Program."
 - 1.17.4 The installing contractor shall provide, at the time of submittal, a letter of intent to provide an extended service warranty. This warranty shall extend for a total of three (3) years, starting at the completion, testing, and training of this project. The service warranty shall cover all material and labor to keep operational all system devices installed under this project, and shall include two (2) complete U.L. system's tests and cleaning of all devices at year two (2) and year three (3) of the warranty. Routine cleaning of devices, other than at the two (2) specified U.L. system's testing periods, will not be included as a part of this warranty.

- 1.17.5 The installing contractor shall provide, at the time of submittal, a letter indicating that the installation crew for this project meets the following NICET certifications:
 - 1.17.5.1 25% of the installing field personnel must have completed NICET Level 2 Certification.
 - 1.17.5.2 One of the installing field personnel and /or supervisor must have completed NICET Level 3 Certification.
 - 1.17.5.3 Contractor shop drawings shall be signed by an individual who has completed NICET Level 4 Certification.
- 1.18 All conduit and standard backboxes will be furnished and installed by the Division 26 Contractor. Specialty boxes will be furnished by the equipment supplier to be installed by the Division 26 Contractor.
- 1.19 Equipment and materials shall be the standard product of FCI.
- 1.20 Alternate equipment as manufactured by any other manufacturer not specifically listed above will not be approved for use on this project.
- 1.21 D.S.A approved drawings are included as a part of the drawing set.

PART 2 - PRODUCTS

- 2.1 Main Fire Alarm Control Panel:
 - 2.1.1 Fire alarm control panel is an existing FCI E3 with Voice Evacuation.
 - 2.1.2 The automatic fire alarm system should comply with (CBC/CFC 907.2.3).The system shall be controlled and supervised by a microprocessor based monitoring fire alarm control panel. The systems shall be addressable, field configurable, programmable and editable. The system shall continuously scan devices for change of status. Each device shall have its own unique address, but shall also be grouped by building as a separate zone for remote annunciation and alarm report purposes (CFC 907.6.6.3)
 - 2.1.3 The system shall be a fiber network and fiber cabling shall be single mode, with capabilities, software and modem to communicate with the District-wide diagnostic and annunciation network.
 - 2.1.4 The fire alarm control panel shall be housed in a lockable, code gauge steel cabinet with 80character LCD display, master controller operator's panel, indicating lamps, silence switch and reset switch mounted on cabinet front. The fire alarm control panel shall be physically and visually located in the general office for monitoring by staff and shall sound the "Voice Message" in all zones. Signal duration shall be field programmable and initially set at three minutes. Provide all control modules, synchronous modules, etc., to provide a complete working system per all codes that apply. With every new system, a documentation cabinet shall be installed at the system control unit or at another approved location at the protected premises (NFPA 72, 7.7.2.1)

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- 2.1.5 The fire alarm control panel shall come with standardized software for on-site customization of the system. The unit shall be capable of providing a 600-event historical log with zone or point selectable alarm verification.
- 2.1.6 Provide a minimum 100 watts of amplification in each FACP with a minimum of 25% spare capacity.
- 2.1.7 The unit shall support a minimum of 3000 intelligent addressable points and one output point, SPST contact per zone. Provide the number of modules necessary to control and supervise fire alarm devices as shown on the Drawings, as well as to provide 25% spare capacity.
- 2.1.8 The unit shall also provide a minimum of (2) class B strobe circuits with additional circuits as indicated on the drawings.
- 2.1.9 The fire alarm control panel shall be capable of providing a walk test.
- 2.2 The power feed for the FACP shall be 3-wire, 120volt, AC, single phase (20A circuit) permanently labeled "FIRE ALARM CONTROL POWER", terminating at the master fire alarm control and supervisory panel. The label shall be red with 1/4" high white lettering. The source circuit breaker must be provided with a lock-on device.
- 2.3 In addition to the AC circuit, the panel shall be equipped with a DC battery to activate an audible alarm and pilot light in case of a power failure on the AC circuit.
- 2.4 The master fire alarm panel shall be equipped with a manual pull lever type, supervised report station.
- 2.5 With the exception of the manually operated report station required at the master fire alarm panel and large assembly areas, the remainder of the school facility shall be equipped with approved, electronically supervised, automatic fire detection devices, such that every room, space, including concealed spaces, such as the attic spaces above ceilings, etc., is provided with approved coverage.
- 2.6 TRANSPONDER PANELS shall provide voice evacuation/annunciation with a minimum 100 watts of audio amplification to support 70v speaker devices and a minimum of (2) Class B Strobe NAC circuits and be fiber networked to the system. Provide for 25% additional capacity for amplification in each Transponder panel.
- 2.7 REMOTE POWER SUPPLIES shall provide a minimum of (4) Class B NAC circuits.
- 2.8 MANUAL FIRE ALARM STATIONS shall be addressable test-reset lock in order that they may be tested, and so designed that after actual emergency operation, they cannot be restored to normal, except by use of a key. An operated station shall automatically condition itself so as to be visually detected, as operated, at a minimum distance of 100 feet, front or side. Manual stations shall be constructed of die-formed, satin-finished aluminum, with operating directions provided on the cover in depressed red letters. The word FIRE shall appear on each side of the stations in depressed letters, 1/2-inch in size or larger. Stations shall be suitable for semi-flush mounting on a standard single-gang box or switch plate, and shall be provided with a terminal block for connection of fire alarm system wiring. Manual pull stations must comply with CBC sections 11B-309 and 11B-403.
- 2.9 SPEAKER / STROBE DEVICE shall be of the semi-flush type designed for mounting to a standard 4 11/16" deep electrical back box. Each device shall be provided with a semi-

flush accessory plate. Exterior speakers shall be weatherproof. The strobe unit shall have a meantime between failure (MTBF) of 1,000 hours or greater. The strobe section shall have a minimum flash rate of approximately one flash per second, with candela rating as per UL standard 1971. Housing shall be white.

- 2.9.1 In areas containing two or more audible devices, or three or more visual devices, these devices shall be synchronized, Per NFPA 72, Chapter 18.5.5.7 California Amendments (2016).
- 2.10 SPEAKERS shall operate at either 25 or 70 VRMS and provide tap setting from 1/8 to 2 watts and provide efficient design for high intelligibility at a minimum wattage across a frequency range of 300 to 8000 HZ and shall be white in color. Speakers shall be ADA, NFPA and ANSI compliant. The audible alarm notification appliances shall provide a sound pressure level of 15 decibels (dBA) above the average ambient sound level or 5 dBA above the maximum sound level having a duration of not less than 60 seconds, whichever is greater, in every occupiable space within the building (CFC 907.5.2.1.1). The maximum sound pressure level for audible alarm notification appliances shall be 110 dBA at the minimum hearing distance from the audible appliance. Where the average ambient noise is greater than 95 dBA, visible alarm notification appliances shall be provided in accordance with NFPA 72 and audible alarm notification appliances shall not be required.(CFC 907.5.2.1.2) To meet the requirements of Section 10.9, the alarm audible signal pattern used to notify building occupants of the need to evacuate (leave the building) or relocate (from one area to another) shall be the standard alarm evacuation signal consisting of a three-pulse temporal pattern (NFPA 72, 18.4.2).
- 2.10.1 Speakers for typical classrooms shall be tapped at ¼ watt with exterior speakers tapped at 2 watts. Other areas such as Theaters, Auditoriums, Gymnasiums, Team Rooms, Cafeterias, Kitchens and all shop areas shall be tapped at ½ watt.
- 2.10.2 Contractor shall also include (2) additional site visits within the first year to adjust speaker output on a space by space basis as requested by the owner.
- 2.11 STROBES. The strobe unit shall have a meantime between failure (MTBF) of 1,000 hours or greater. The strobe section shall have a minimum flash rate of approximately one flash per second, with candela rating as per UL standard 1971. Housing shall be white.
- 2.11.1 In areas containing two or more audible devices, or three or more visual devices, these devices shall be synchronized, per NFPA 72, Chapter 18 California Amendments (2016).
- 2.11.2 Maximum pulse duration to be 0.20 of a second with an ADAAG 4.28.3(3). Visual alarms maximum duty cycle of 40%.
- 2.11.3 Capable of providing minimum candela. Intensity as shown on plans (effective strength measured at the source).
- 2.11.4 The flash rate to be a minimum of 1 Hz and a maximum of 2 Hz per NFPA 18.5.3.1.
- 2.12 HEAT DETECTOR DEVICES shall be analog addressable, fixed temperature x rate of rise, fixed at 200EF and a 15EF/min rate of rise. In janitor rooms equipped with kilns, devices shall be fixed at 200EF.
- 2.13 SMOKE DETECTOR DEVICES shall be analog addressable, photo-electric.

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- 2.14 SMOKE DETECTOR/CO-CARBON MONOXIDE combination detectors shall be analog addressable, photo-electric type and provided in all Group E Classrooms with a sounder base to alarm individual classrooms with a 4-pulse temporal pattern as well as transmitting a signal to the staffed remote annunciator.
- 2.15 DUCT TYPE DETECTORS shall be analog addressable, photo-electric type, provide with remote test switch and auxiliary contacts as required for control of A/C units or smoke dampers.
- 2.16 DIGITAL ALARM COMMUNICATOR TRANSMITTER. The control panel shall meet the requirements of UL 864 for central station connections, and shall be UL listed for use with the fire alarm control panel. The communicator shall be connected to supervise two telephone lines, all wiring required for this connection shall be provided by the fire alarm contractor Coordinate interface with District monitoring company as required.
- 2.17 REMOTE ANNUNCIATOR shall be an 80 character backlit, alphanumeric, LCD readout display. The display shall include alarm, supervisory, CO detection and trouble condition LEDs and tone alert. Each condition shall have a dedicated acknowledge push button switch to silence the local tone alert but leaves the LED lights on until all conditions have been restored.

PART 3- EXECUTION

- 3.1 All wiring shall be (min) #18 AWG copper or as noted on drawings. All underground conductors shall be UL wet location rated for use in wet locations, West Penn "Aquaseal" or equal. There shall be no splices in underground handholes or vaults. A multi-conductor cable rated for use in wet locations will also be acceptable. It must be labeled "FIRE ALARM" in all pull boxes, using a water-tight labeling system.
- 3.2 Interior, dry location wiring for low voltage initiating circuits shall be #18 AWG copper, twisted shielded pair minimum, signaling circuits shall be No. 14 AWG minimum, and wiring for 120 volt circuits shall be No. 12 AWG minimum. All wiring shall be color coded, solid copper conductor. Use of power limited cable shall be restricted to controls listed for this purpose. Single conductors shall be type THHN/THWN-2 insulated copper.
- 3.3 Wire markers shall be provided for each wire connected to equipment. The marker shall be of the taped bank type, of permanent material, and shall be suitable and permanently stamped with the proper identification. The markers shall be attached in a manner that will not permit accidental detachment. Changing of wire colors within circuits shall be unacceptable.
- 3.4 A terminal cabinet shall be installed in the electric room for the fire alarm systems at each building. All fire alarm wiring shall terminate on UL approved strips in this terminal cabinet. All wiring shall be labeled at each termination strip. Wiring shall be configured such that all end-of-line resistors will be installed at the terminal cabinet.
- 3.5 Fire Sprinkler Activation detecting System(s) shall each be indicated on a separate zone in the fire alarm control panel.
- 3.6 Fire Alarm Control Panel and all other equipment shall be mounted with the center of all operable reset buttons, located a maximum of 48" front approach / 54" side approach above floor level.
- 3.7 Contractor shall provide complete wiring between all equipment.

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- 3.8 The Fire Alarm/Life Safety Installation shall comply fully with all Local, State and National Codes, and the Local Authority Having Jurisdiction (AHJ) DSA.
- 3.9 The Fire Alarm Control Panel and power supply shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the Panelboard as FIRE ALARM CIRCUIT.
- 3.10 The Control Panel Cabinet shall be grounded securely to a power system ground conductor. Provide a 1/2-inch conduit and 1#12 grounding conductor to the building electrical service ground bus.
- 3.11 Conduit shall enter into the Fire Alarm Control Panel back box only at those areas of the back box which have factory conduit knockouts.
- 3.12 All field wiring shall be completely supervised. In the event of a primary power failure, disconnected standby battery, removal of any internal modules, or any open circuits in the field wiring; an audible and visual trouble signal will be activated until the system and its associated field wiring are restored to normal condition.
- 3.13 All cables and wiring shall be listed for Fire Alarm/Life Safety use, and shall be of the type as required by and installed per CEC Article 760.
- 3.14 Final System Acceptance
 - 3.14.1 Provide an NFPA Certificate of Compliance to DSA and the engineer of record. Complete fire alarm system shall comply with Chapter 14 of NFPA for testing and inspection and be sound-tested for audibility in all spaces requiring voice evacuation. This testing shall be performed in the presents of the project electrical engineer. Adjust speaker taps or provide additional speakers as required to provide correct audibility.
 - 3.14.2 Beam detectors shall be tested by two methods:
 - 3.14.2.1 Manual slow cover test to confirm reflector alignment is correct.
 - 3.14.2.2 Software fire test per UL268.5 to demonstrate when signal level is reduced simulating obstruction the detector will go into alarm.
 - 3.14.3 The system will be accepted only after a satisfactory test of the entire system has been accomplished by a Factory-Trained Distributor in the presence of a representative of the authority having jurisdiction and the Owner's representative. This contractor shall provide all personnel, ladders and testing equipment to assist the local authority in completing this test. Actuate each device and verify that the system performs as specified.
 - 3.14.4 The Contractor will present a complete set of "as-built" Fire Alarm/Life Safety system drawings, and the factory supplied Operator's Manuals as required by the General Provisions section of this specification.
 - 3.14.5 Once the system has been tested and the certificate of compliance completed, the contract shall not be considered complete until after owner training has been completed. The contractor shall notify in writing their intent to provide the training for the system. This notification shall be given to the Division 21 Contractor, Architect and the Project Engineer a minimum of 2 weeks prior to the scheduled training session. The Division 21 Contractor and/or the architect shall be

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responsible for notifying the owner to confirm that the appropriate District personnel will be made available for this training session. If the Division 21 Contractor does not receive confirmation that the training session can be performed on the proposed date, then another time shall be provided. The training shall consist of the following:

- 3.14.5.1 Provide a minimum of one (1) four-to-six -hour training period located at the project site, to instruct District personnel in proper operation of all systems.
- 3.14.5.2 Provide a minimum of three (3) complete owner operation manuals for the District records.
- 3.14.5.3 Provide a minimum of two (2) complete as built sets of drawings for the District records.
- 3.14.5.4 Provide all spare parts as described in part 1 of these specifications
- 3.14.5.5 Provide written confirmation and proposed scheduled dates for follow up training and 1-year complete system test.

3.15 Follow up Training

- 3.15.1 Provide as a part of this contract, the follow up instructional training period within six (6) months after the final acceptance of the systems. This training shall include a minimum of one four-to-six-hour training period to instruct District personnel in proper operation of all systems and shall instruct the District technicians how to repair any non-operational parts of the system as required. All defective parts shall be replaced at no cost to the owner.

END OF SECTION

31 00 00

EARTHWORK

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SECTION 31 10 00

SITE CLEARING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Site clearing as specified herein.
- B. Related Sections:
 - 1. Section 31 20 00, Earth Moving.
 - 2. Section 33 44 19, Utility Storm Water Treatment.
 - 3. Section 01 50 00, Temporary Facilities and Controls.
- C. Principal items of Work included herein:
 - 1. Site clearing and Grubbing.

1.02 REFERENCES

- A. Demolition shall be as per 2019 California Fire Code, Title 24, Part 9, Chapter 33.

1.03 PROJECT SITE CONDITIONS

- A. The Contractor shall be responsible to furnish and maintain all temporary barricades, warning lights, and other types of protection and to prevent accidental injury to the general public and personnel on the project.
- B. Existing improvements and 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. The Contractor shall be responsible to restore to their original condition any of these existing items that are damaged or disturbed.
- C. The Contractor shall be responsible to protect adjacent properties, roads, right of ways, utilities and other improvements above or below ground from damage in performing the work.
- D. Comply with applicable sections of the storm water pollution prevention plan, including but not limited to, erosion control, soil, waste and maintenance areas. Comply with the
- E. Salvaged Materials: Owner requires that a minimum of 50% (by weight) of all non-hazardous construction materials be recycled, composted and/or salvaged. Salvage shall conform to the following:
 - 1. Contractor shall submit salvage plan showing how all materials are to be sorted, salvaged and recycled. Plan must include all final destinations for each type of material.
 - 2. Salvaged items must be transported from site as they are removed, unless materials are to be reused on site.
 - 3. Storage or sale of removed items on site will not be permitted, unless materials are to be reused on site.

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4. Contractor shall provide certification for all salvaged materials. Certifications may take the form of receipts from recycling facilities, manufacturers, or any other legitimate form of certification. Certification types shall be outlined in salvage plan and approved by Owner.

**PART 2 - PRODUCTS
(Not Applicable)**

PART 3 - EXECUTION

3.01 EXECUTION

- A. Completely remove from the site (as required for construction) existing vegetation, trees, shrubs, bushes, debris, poles, posts, houses, sheds, garages, structures, footings, foundations, piers, curbs, walls, steps, slabs, pavement, substructures, underground utilities, cesspools, weir boxes, irrigation lines and appurtenances, septic tanks, fences, basement walls and slabs, tanks, manure, etc., unless otherwise indicated, including any other items necessary to construct the new work under this contract.
- B. Items removed shall be disposed of, off the property, in a legal manner.
- C. Trees and tree stumps unless indicated to remain, shall be removed, together with the bulk of the roots, to a minimum depth of 3 feet below the existing grade or finish grade, whichever is lower, within a radius of eight feet beyond perimeter of trunk at ground line. The resulting holes created by the tree removal shall be filled with clean earth and compacted to the same density as specified in Section 31 10 00, Earth Moving, for fills. Holes resulting from the tree removal shall not be backfilled until approved by the Inspector or other designated authority.
- D. 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.
- 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 10 00, Earth Moving and/or geotechnical report.
- F. Discussing existing vegetation into existing surface soils will not be permitted under any circumstances.
- G. Coordinate timing of demolition of existing temporary drainage structures with construction of new permanent drainage structures.

END OF SECTION

SECTION 31 20 00

EARTH MOVING

The Architect shall advise the District on the minimum number of soil borings that are required by code based on the size and configuration of the proposed structures and pavements for the purpose of soliciting Geotechnical services from a qualified Geotechnical engineer. In the event a project site is located near unusual geologic features, i.e., severe slopes, rock outcrops, etc., the Architect shall advise the District, in consultation with the Geotechnical engineer, how many additional borings they think would be needed in order to establish with some measure of confidence, that the subsurface conditions can be characterized as accurately as is reasonably possible. The Architect's assistance in this aspect of the project shall not convey any liability for the accuracy or completeness of the Geotechnical report. The Architect is acting in an advisory capacity only. The Geotechnical engineer shall at all times remain the sole design professional responsible for all Geotechnical recommendations.

When existing buildings prevent access to preferred boring locations, other methods should be considered such as slant drilling to obtain adequate coverage of the site.

Upon receipt of a Geotechnical report, the Architect shall review it and shall ask for clarification or additional information as they deem necessary.

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: All required excavation, grading, preparation of subgrade for fills, proper placement of fills, including backfilling and compaction, watering, rolling, and compacting of fill material in place, and finish grading.
- B. Principal items of Work included herein:
 - 1. Excavation
 - 2. Filling
 - 3. Backfilling
 - 4. Geotechnical Engineer Inspection and Testing
 - 5. Grading
 - 6. Miscellaneous related work necessary for a complete job.
- C. Related Sections:
 - 1. Site Clearing, Section 31 10 00.
 - 2. Excavation and Fill, Section 31 23 00 for Utilities and Storm Drains.
 - 3. Utility Storm Water Treatment, Section 33 44 19 (Architect to Verify).
 - 4. Off-Site Improvements, division 2 (Architect to Verify)

1.02 PROJECT DATA

- A. Geotechnical Reports: The existing soil conditions at the site have been investigated, and a report of findings is on file at the Architect's office for review by the Bidders during the bidding period. This information is offered as supplemental information only, and no guarantee of existing soil or other conditions is intended. Architect to verify with Geotechnical Engineer for the desired wording for this paragraph.

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Geotechnical / Geologic Investigation:

Title:

Report Date:

Prepared by:

Project No.

- B. The existing soil conditions at the site have been investigated and a report of the findings is on file at the District Office.

1.03 PERFORMANCE REQUIREMENTS

- A. All grading work shall be performed in accordance with 2019 CBC, Title 24, Part 2.
- B. The Grading Code of the County of _____, City of _____, and any special requirements of the permit.
- C. The Preliminary Geotechnical Investigation prepared by _ date __.
- D. Applicable General and Special Conditions of these specifications hereinafter set forth in full or by reference.
- E. A final Grading Report shall be submitted by the Geotechnical Engineer in accordance with 2019 CBC, Title 24, Part 2.

1.04 QUALITY CONTROL

- A. Testing and Inspections:
 - 1. A Geotechnical Engineer, designated by the Owner, shall be engaged to perform continuous inspection of the placing and compacting of fills and backfills within the limits of grading of this project. Work shall be done in accordance with these specifications, the requirements of California Building Code, Chapters 18A and 33, and as recommended and approved by the Geotechnical Engineer. Costs for such inspection and tests shall be paid by the Owner. The Contractor shall be responsible for notifying the Geotechnical Engineer in advance so that he may be present to perform his services as needed.
 - 2. The Geotechnical Engineer 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, and to confirm the expansion and other specified characteristics of the fill material.
 - 3. The Geotechnical Engineer shall submit compaction reports to the Architect, Structural Engineer 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 Engineer shall keep the Architect and Civil Engineer informed of the progress of the grading work.

1.05 SITE CONDITIONS

- A. Protection:
 - 1. Protect adjacent property as required to prevent caving and sloughing of material

onto adjacent property.

2. Utility lines and structures shown shall be protected and treated as indicated. Where utilities not shown are encountered, report it to the Architect before proceeding with excavation. Remove inactive lines as directed, and plug the remaining ends. The Contractor shall bear the cost for all repairs to damaged utilities.
- B. Environmental Requirements: Contractor must comply with all requirements of the applicable County of San Diego and the City of _____ dust control ordinances. Comply with applicable sections of the Storm Water Pollution Prevention Plan, including but not limited to erosion control, material stockpiling, vehicle parking and maintenance areas.
1. Construction operations and maintenance of equipment shall be performed only during the time period(s) and days allowed by local ordinance or government agency having jurisdiction.
 2. Earthwork operations shall be scheduled to complete the Work as quickly as possible to reduce the noise, dust and air pollution impacts.

PART 2 - PRODUCTS

2.01 FILL MATERIAL

- A. Additional earth material required to complete the work shall be provided by the Contractor at his expense.
- B. All earth imported products to the site shall meet or exceed United States Environmental Protection Agency (US EPA), Department of Toxic Substances (if applicable), and State of California regulations for clean fill. Proof of compliance is the responsibility of the Contractor.
- C. If this is a DTSC regulated site – contractor shall revise this paragraph to reflect the language agreed to in any PEAs, or other mitigation agreements.
- D. All imported material shall be approved by the Geotechnical Engineer prior to hauling on site. Contractor shall deliver samples to testing lab, labeled with location, project name, and date.
- E. Imported earth shall be of granular nature with sufficient binder to form a firm, stable, unyielding subgrade. Adobe or clay soils will not be acceptable. Earth imported shall be relatively non-expansive with an expansion index of less than 50, be clean and free from rubbish and debris and rock larger than 3 inches in maximum dimensions, not have sulfate content greater than 1,000 parts per million, and be subject to the approval of the Geotechnical Engineer. Imported fill material shall have an electrical resistivity exceeding 3,000 ohm cm. when saturated with distilled water, measured in accordance with the minimum resistivity procedure of California Test 643 or the soil resistivity box procedure shown in ASTM G57-06. Imported material to be used in areas to receive planting shall be approved by the Landscape Consultant of such quality as to support plant life.
- F. Bedding and backfill material for storm drain and utility lines shall be imported clean sand with a sand equivalent of at least 30 (California Test Method #217), and shall be placed in a minimum thickness of 6 inches for bedding and backfilled to 12 inches above the top of pipe.

2.02 SPECIAL REQUIREMENTS

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- A. If imported soils are used within the upper 12 inches of areas to be planted, these soils shall conform to the requirements for planting soils as specified herein. Otherwise the upper 12 inches of all areas to be planted in the future shall consist of material obtained from the upper 12 inches of existing on-site soils.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Protect adjacent property and existing improvements and structures as necessary to prevent undermining, caving of cuts, and miscellaneous damage.
- B. Provide cribbing, sheeting, 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. Be responsible for the design, installation, and maintenance of required cribbing and shoring and same shall meet the approval of the State Division of Industrial Safety and local governing agencies requirements.
- C. 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. Encase active lines in sleeves where they pass through concrete; remove inactive lines as directed, and plug the remaining ends. Bear the costs for repairs to damaged or broken utilities and any damages related thereto.
- D. An on-site, Pre-grading Meeting with the Architect, the General Contractor, and Geotechnical Engineer, Civil Engineer, Inspector and the Utility Line and Earthwork Subcontractor(s) is required prior to all grading related operations. The Pre-Job Conference will immediately follow the Pre-Construction Conference. Attendance is mandatory. City Inspection representatives and Utility Company representatives may also attend.
- E. Protect existing improvements and adjacent properties from storm damage and flood hazard originating on this project until final acceptance by the Owner. Prevent silt run-off from the limits of work in accordance with governmental requirements.
- F. A 6 foot high, temporary chain link fence and gates, (pair 26' wide, minimum) shall be erected prior to any grading operations at the construction limits perimeter. Coordinate the exact location with Architect and Inspector.

3.02 EXCAVATION

- A. Strip vegetation in accordance with Section 31 10 00 - Site Clearing. This material shall be disposed off site in a legal manner. All non-hazardous materials shall be composted, if possible. Contractor shall provide certification of composting location.
- B. Excavate unsuitable materials including compressible alluvium, expansive clay, organic material, contaminated soils, or other unsuitable materials. Any remaining dry, loose or soft materials should also be removed until a stable, unyielding condition under equipment loads is achieved. After making the recommended removals and prior to fill placement, the exposed ground surface shall be scarified to a depth of approximately 8 inches, brought to slightly above optimum moisture content, and compacted to at least 95% of the maximum dry density obtainable by the ASTM D1557-12 Standard Test Methods of Laboratory Compaction Characteristics of Soil Using Modified Effort.

Surfaces on which fill is to be placed which are steeper than 5:1 (horizontal to vertical) should be benched so that the fill placement occurs on relatively level ground.

If it is observed that on-site soils contain clay and that it appears to be potentially expansive, these soils are not considered suitable for foundation, floor slab or pavement support. If expansive clay soils are located within 3 feet of the bottom of foundations, floor slabs or other concrete walks or slabs, or within 18 inches of paving base course, they shall be removed and replaced with non-expansive compacted fill soils. The over-excavated area shall extend horizontally at least 10 feet beyond the building perimeter. The replacement fill material may consist of on-site or imported non-expansive soil with an Expansion Index of less than 50.

- C. Based on the proposed Grading Plans, a cut/fill transition will cross the building pad area. Over-excavation of the building pad area shall be performed to allow placement of at least 4 feet of non-expansive compacted fill beneath all foundations or slabs to 10 feet beyond the building area.

The building area is defined as outside face of any structure (i.e. wall, column, post) supporting or attached to overhead framing or roof structure, including masonry site walls over 5 feet high.

- D. Excavate to the depths, lines and grades indicated. Excavate sufficiently over-size to permit installation and removal of concrete forms and other required work.

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 Engineer.

- E. Footing pads, if poured neatly, may be excavated to the net pad widths plus two-inches if approved by the Architect. Approval shall not be given until the completed excavation has been inspected.
- F. Should footing excavations exceed required 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.
- G. Notify the Inspector 48 hours before foundation excavations are ready for inspection.
- H. The bottoms of footings shall be free of loose material, debris, and water before concrete is placed.
- I. 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 shall produce the finish surfaces as shown on the Drawings.
- J. Surplus earth not needed for filling and grading shall be disposed of in a legal manner off the site.

3.03 FILLING

- A. Fill material shall be placed in horizontal lifts not to exceed 6-inches in depth. Backfill placed in narrow restricted areas, such as along utility trenches, may be placed in 12-inch thick lifts. All fill material shall be free of rocks larger than 3 inches in maximum dimensions. Each layer shall be brought to slightly over optimum moisture content and,

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while still moist, shall be compacted by rolling and tamping. The rolling and/or tamping of each layer shall continue until the density thereof is not less than 95% of the maximum density obtainable using the ASTM D1557-12.

- B. 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 Engineer's requirements and local governing public agencies' requirements and compacted as herein specified before placing fill material on same so that fills shall be placed in horizontal layers as specified. Widths of benches shall be as directed by the Geotechnical Engineer.
- C. Rock encountered in the excavation on this site may, at the option of the Contractor, be broken up into pieces not larger than 3 inches in maximum dimension and be incorporated in the fill material if spread as directed by the Geotechnical Engineer. Otherwise, rocks larger than 3 inches in maximum dimension shall be removed from the site. Rocks and stones larger than 1 inch in maximum dimension will not be permitted within the top 12 inches of finished grade in non-paved areas. Contractor is responsible for examining geotechnical report to determine if rock or hard digging will be encountered and make provisions in the bid for removal of such materials. No additional payment will be made for rock removal or hard digging.
- D. 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. Slopes shall be inclined no steeper than 2:1 (horizontal to vertical).
- E. Imported fill soils shall have an Expansion Index of less than 50 based on ASTM D4829, and an R-Value of at least ___ for pavement areas.

The top 12 inches of the pavement subgrade shall be compacted to at least 95% of maximum dry density as determined by ASTM D1557-12.
- F. Retaining walls shall be backfilled with soil having an Expansive Index of 20 or less. The backfill area shall include the zone defined by a 1:1 sloping plane, back from the base of the wall. Retaining wall backfill should be compacted to at least 90% relative compaction based on ASTM D1557-12. Backfill should not be placed until walls have achieved adequate structural strength. Heavy compaction equipment which could cause distress to walls should not be used.

3.04 GRADING

- A. 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. Should any low spots develop during the rolling operation, such spots shall be filled and rerolled smooth. Slopes, banks, and drainage depressions shall present a neat, uniform appearance on completion of the work. Provide temporary access roadways as needed during construction.
- B. 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 from 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.

3.05 COMPACTION

- A. All fills shall be compacted to at least 95 percent of maximum density obtainable using the ASTM D1557-12. Areas which are scarified shall be recompactd to these same requirements. The soil within the upper 12 inches of pavement subgrade should be compacted to at least 95% relative compaction based on ASTM D1557-12.
- B. Compaction by flooding is expressly prohibited.

3.06 CRIBBING AND SHORING

- A. Provide cribbing, sheeting, 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 be in accordance with the current requirements of CAL-OSHA, the Industrial Accident Commission of the State of California, and all other public agencies having jurisdiction.

3.07 DUST CONTROL

- A. During grading operations, water shall be applied to the surfaces in the working area at frequent intervals and in sufficient quantities to lay the dust and for proper compaction. No other method will be permitted.

3.08 GRADING TOLERANCES AND SUBGRADE PROVISIONS

- A. Rough grading shall consist of grading to the finish grade elevations indicated on the grading plans, including, but not limited to, excavation, scarification, filling, compacting, importing, exporting, preparation of sub-grades, building pads, slopes, berms, ramps, etc. Rough grading shall also include grading to and providing the finished subgrade surface for all asphalt and cement concrete areas, building, ramps, gutters, etc. Rough grading shall be performed within a tolerance of 1/10 of a foot of the elevations indicated on the Drawings (including subgrade elevations) however, this is not to be construed as being permissible to leave the entire area 1/10 of a foot consistently high or low by that amount.

3.09 CLEANING

- A. Upon completion of work in this Section, remove rubbish, trash, and debris resulting from operations. Remove unused equipment and implements of service, and leave entire area involved in a neat, clean, and acceptable condition.

END OF SECTION

SECTION 31 22 19

FINISH GRADING

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide materials, labor and equipment necessary for the completion of finish grading as indicated on the Drawings and specified herein.
- B. Related Sections:
 - 1. Earth Moving, Section 31 20 00.
 - 2. Excavation and Fill, Section 31 23 00, for Utilities and Storm Drains.
 - 3. Utility Storm Water Treatment, Section 33 44 19, for Storm Water Pollution Protection.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Refer to Section 31 20 00 – Earth Moving, for material for fill and planting areas.

PART 3 - EXECUTION

3.01 PREPARATION FOR FINISH GRADING

- A. 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.

Should low spots develop during the rolling operation, such spots shall be filled and re-rolled smooth. Slopes, banks, and drainage depressions shall present a neat, uniform appearance on completion of the work.
- B. 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.
- C. 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.
- D. Areas to Receive Paving or Surfacing: Review plans and details for each area. See plans for paving and base course thickness. Review Drawings for sitework details.
- E. 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.
- F. Rocks or cobbles larger than 1 inch in diameter shall not be placed in the upper 12-

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inches of planting area fill, and rocks or cobbles larger than 3/4-inch shall not appear on the finish graded surface.

G. Surplus or Imported Material:

1. Surplus material not needed for filling shall be removed from the site in a legal manner.
2. Provide additional earth material per Section 31 20 00, Earth Moving.

H. Preparation for Fills:

1. Prior to placing fills, the existing surface shall be scarified and recompact to at least 95 percent maximum dry density per the ASTM D1557-12 procedure.

3.02 FIELD QUALITY CONTROL

- A. Compaction of soils performed on this project shall be at least 90 percent of the maximum dry density per the ASTM D1557-09 procedure. New turf and planted areas shall be compacted to 85 percent. Aggregate bases shall be compacted to 95 percent.
- B. All layout shall be performed by a qualified licensed civil engineer or surveyor.

END OF SECTION

SECTION 31 23 00

EXCAVATION AND FILL FOR STORM DRAINS AND UTILITIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Excavation and backfill for utilities and storm drains as indicated on the Drawings and specified herein, including off-site work.

1.02 REFERENCE STANDARDS

- A. Title 24, California Code of Regulations, California Building Code, 2019, and County of San Diego Grading Ordinance.
- B. CAL-OSHA requirements.
- C. Standard Drawings of the County of San Diego.
- D. The Standard Specifications for Public Works Construction, current edition.

1.03 PERFORMANCE REQUIREMENTS

- A. Be fully responsible to furnish and maintain temporary barricades, warning lights, and other types of protection and to prevent accidental injury to the general public and personnel employed on the project.
- B. Provide adequate cribbing, sheathing, and shoring as necessary to safely retain the earth sides of excavations and trenches from caving and other damage resulting from excavating, together with suitable forms of protection against property damage and bodily injury to personnel employed on the work and the general public. The Contractor shall be responsible for the design, for installation, and maintenance of required cribbing and shoring.
- C. Protect new and existing utilities from damage during the course of installation, and repair work so damaged at no additional cost to the Owner.

1.04 PERMITS

- A. Obtain permits, fees, or bonds required for the work performed under this section. Owner will pay the cost of permanent construction permits. Bonds and encroachment permits shall be paid by the Contractor.

1.05 INSPECTION AND TESTING

- A. A Testing Laboratory designated by the Owner and approved by the Division of the State Architect, will be engaged to perform tests and inspections of the placing and compacting of backfills. Work shall be done in accordance with these Specifications. Costs for inspection and conforming tests shall be paid by the Owner.
- B. Contractor shall be responsible for notifying the Testing Laboratory at least 48 hours in advance of the time where testing services are needed.

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- C. The Testing Laboratory shall submit compaction reports to the Architect, and shall notify the Architect immediately of test failures.
- D. Refer to Section 01 45 23 - Testing and Inspecting Services for additional requirements.

1.06 QUALITY ASSURANCE

- A. Underground utility lines shall not be covered by backfill until "As-Built" elevations and dimensions have been recorded on Record Drawings, and until the utility lines have been inspected and satisfactorily tested. As-built elevations shall be provided by the contractor's licensed surveyor. See Section 01 71 23, Field Engineering.
- B. Before commencing backfilling of utilities, take photo-graphs showing relationship of below ground utilities to structure(s) or other physical reference point. Provide three-ring binder containing 5" x 7" prints of photos, and negatives categorized by locations and indicating utilities shown.

Number each photograph and provide a site plan with a location shown for each photo. The location of the number shall correlate with the place the photo was taken and the direction the camera was pointed.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Bedding sand shall be as defined by Standard Specifications for Public Works Construction, current Edition (Green Book) Section 202.2, and shall be free of expansive material and organic matter. Bedding material for utility lines and storm drains outside the property lines shall be as required by the agency having jurisdiction.
- B. Backfill material shall be as required in Section 31 20 00 – Earth Moving. All requirements specified in that section for fill, backfill, import, and planting soil shall apply to material used for utility and storm drain trenches.
- C. Engineer to enter any specific requirements from Geotechnical Report for Project.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Underground Utilities: Carefully lay out the route of each underground utility prior to trenching. Coordinate the work of various trades to avoid conflicts.
- B. Clearances: Maintain required horizontal and vertical clearances from structural footings for utility trenches running parallel to footings. In the event of conflict the Architect shall be notified.
- C. Saw cut and remove any pavement necessary for installation of all utilities shown on the plans, including architectural, landscape, civil, plumbing, electrical and low voltage. Provide new pavement to match the existing pavement removed, if not specifically shown differently on the plans. In all cases, the worst case rules.

3.02 TRENCHING

- A. Excavate trenches for utilities to the required lines, grades and elevations indicated on the drawings and as specified. Hand trim changes in direction and bottoms of trenches. Accurately shape and thoroughly compact trench bottom to required grade. Keep trenches clean until installed work has been approved.
- B. Trench Dimensions: For adequate pipe clearances and dimensions provide the following minimum dimensions unless otherwise required by the drawings, specifications, utility company regulations, codes, or manufacturers recommendations.

1. Pipe Depths:

- a. Sewer: Minimum 30 inches plus pipe diameter plus 4 inch bedding.
- b. Storm Drain: Minimum 24 inches plus pipe diameter plus 4 inch bedding.
- c. Gas: 30 inches plus pipe diameter plus 4-inch bedding.
- d. Domestic Water:
PVC: 36 inches plus pipe diameter plus 4 inch bedding.
Other: 36 inches plus pipe diameter plus 4 inch bedding.
- e. Irrigation Water:
 - 1) 3 inch diameter or less: 18 inches plus pipe diameter plus 2 inch bedding.
 - 2) 4 inch diameter or more: Same as domestic water.

2. Trench Widths:

- a. Sewer: 6 inches plus pipe diameter min.
- b. Storm Drain: 6 inches plus pipe diameter, min..
- c. Gas: 8 inches plus pipe diameter, min.
- d. Domestic Water: 8 inches plus pipe diameter, min.
- e. Joint Trench: Joint trenches are allowed in accordance with the current edition of the Greenbook, Standard Specifications for Public Works Construction and local jurisdiction standards. Contractor shall submit a trench plan to the project engineer for approval prior to proceeding with joint trenches not shown on the plans. Contractor cannot assume joint trenches are allowed during bidding, unless joint trenches are shown on the plans.

3.03 BEDDING

- A. Lay pipe in compacted bedding sand of thickness as specified above and backfill with bedding sand to a height of 12 inches above the top of the pipe. Place sand in 6 inch layers, compacting each lift to a minimum relative density of 90 percent. Compaction by

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flooding is prohibited.

- B. For irrigation piping laying requirements refer to Section 32 84 00 – Planting Irrigation.

3.04 BACKFILLING

- A. Backfill with approved native or import soils as specified in Article 2.01 herein.
- B. Spread, water, and mix backfill to obtain optimum moisture content. Compact by mechanical means in 6 inch lifts to a minimum relative density of ninety percent (95%) in accordance with ASTM D1557-12, after the first 12-inches.
- C. Continue backfilling as required to secure final grade elevations.
- D. Backfill existing utilities which may be uncovered during course of construction in the same manner as specified herein for new utilities.
- E. Coordinate backfilling with representative of Owner's Testing Laboratory.

3.05 CLEANUP

- A. Transport unsuitable material to a legal off-site disposal area.

END OF SECTION

SECTION 31 50 00

EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. This section includes, but is not limited to the following:
 - 1. Shoring and bracing necessary to protect existing buildings, streets, walkways, utilities and other improvements and excavation against loss of ground or caving embankments.
 - 2. Maintenance of shoring and bracing.
 - 3. Removal of shoring and bracing, as required.
- B. Types of shoring and bracing systems include, but are not limited to, the following:
 - 1. Steel H-section (soldier) piles.
 - 2. Timber lagging.
 - 3. Steel sheet piles.
- C. Reference Section 31 20 00 – Earth Moving.

1.02 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.
- B. Layout drawings for excavation support system and other data prepared by, or under the supervision of, a qualified professional engineer, licensed in the State of California. System design and calculations must be acceptable to local authorities having jurisdiction.

1.03 QUALITY ASSURANCE

- A. Engineer Qualifications: A professional engineer legally authorized to practice in jurisdiction where Project is located, and experienced in providing successful engineering services for excavation support systems similar in extent required for this Project.
- B. Supervision: Engage and assign supervision of excavation support system to a qualified professional engineer foundation consultant.
 - 1. Submit name of engaged consultant and qualifying technical experience.
- C. Regulations: Comply with codes and ordinances of governing authorities having jurisdiction.

1.04 JOB CONDITIONS

- A. Before starting work, verify governing dimensions and elevations. Verify condition of adjoining properties. Take photographs to record any existing settlement or cracking of structures, pavements, and other improvements. Prepare a list of such damages, verified

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by dated photographs, and signed by Contractor and others conducting investigation.

- B. Survey adjacent structures and improvements, employing qualified professional engineer, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
- C. During excavation, resurvey benchmarks weekly, maintaining accurate log of surveyed elevations for comparison with original elevations. Promptly notify Architect if changes in elevations occur or if cracks, sags, or other damage is evident.

1.05 EXISTING UTILITIES

- A. Protect existing active sewer, water, gas, electricity and other utility services and structures.
- B. Notify municipal agencies and service utility companies having jurisdiction. Comply with requirements of governing authorities and agencies for protection, relocation, removal and discontinuing of services.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Provide adequate shoring and bracing materials which will support loads imposed. Materials need not be new, but should be in serviceable condition.
- B. Structural Steel: ASTM A36.
- C. Steel Sheet Piles: ASTM A328
- D. Timber Lagging: Any species, rough-cut, mixed hardwood, nominal 3 inches thick, unless otherwise indicated.

PART 3 - EXECUTION

3.01 SHORING

- A. Wherever shoring is required, locate the system to clear permanent construction and to permit forming and finishing of concrete surfaces. Provide shoring system adequately anchored and braced to resist earth and hydrostatic pressures.
- B. Shoring systems retaining earth on which the support or stability of existing structures is depending must be left in place at completion of work.

3.02 BRACING

- A. Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move a brace, install new bracing prior to removal of original brace.
- B. Do not place bracing where it will be cast into or included in permanent concrete work, except as otherwise acceptable to Architect.
- C. Install internal bracing if required, to prevent spreading or distortion of braced frames.
- D. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

- E. Remove sheeting, shoring, and bracing in stages to avoid disturbance to underlying soils and damage to structures, pavements, facilities and utilities.
- F. Repair or replace, as acceptable to Architect, adjacent work damaged or displaced through installation or removal of shoring and bracing work.

END OF SECTION

32 00 00

EXTERIOR IMPROVEMENTS

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SECTION 32 01 31

STABILIZED DECOMPOSED GRANITE SURFACE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Section includes: Constructing a decomposed granite surface.

1.02 REFERENCES

- A. American Society of Testing and Materials (ASTM):
 - 1. C136, Method for Sieve Analysis for Fine and Coarse Aggregates.

1.03 QUALITY ASSURANCE

- A. Installation shall be by a contractor and crew with at least one year of experience in placing decomposed granite with stabilizer on projects of similar nature or dollar cost.
- B. Paving: Contractor shall replace without additional cost to the Agency all areas of paving which may become defective within on (1) year after date of acceptance.
- C. Sterilization: Contractor shall maintain all areas of paving free of vegetation growing through from below for (90) days after date of acceptance. Any procedure required for eradication of such vegetation growth shall be done by the Contractor at no additional cost to the Agency.

1.04 SUBMITTALS

- A. As specified in Section 01 33 00, and as follows:
 - 1. Submit sieve analysis of proposed material to ensure it meets grading requirements.
 - 2. Products: Five lb. sample and sieve analysis for grading of decomposed granite or crushed 3/8" minus aggregate. Color to be selected by Architect.
 - 3. Sieve analysis and color of crushed aggregate screenings shall be approved in Writing by the Architect before any material is delivered to the project site.
 - 4. Test Results: from an independent testing laboratory for compliance of gradation of decomposed granite material or 3/8" minus crushed aggregate in accordance with ASTM C136 – Method for Sieve Analysis for Fine and Coarse Aggregates.

1.05 MOCK-UPS

- A. Install 4 ft. wide x 10 ft. long mock-up of decomposed granite or 3/8 inch minus crushed aggregate paving with stabilizer binder additive at location as directed by Owner's Representative.
- B. This area shall be the standard from which the work will be judged and shall it be incorporated into the work.

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1.06 EXCESS MATERIALS**

- A. Provide Owner's Representative with the following excess materials for use in future decomposed granite or crushed 3/8" minus aggregate paving repair:
 - 1. 40-50 lb bags of aggregate paving.
 - 2. 1 – 40 lb. bag of the stabilizer binder additive.

1.07 PROJECT CONDITIONS

- A. Use lightweight hauling equipment. Exercise care in using equipment, avoiding damage to adjacent plant and tree growth. Do not install decomposed granite or crushed 3/8" minus aggregate paving during rainy conditions or below 40 degrees and falling.

PART 2- PRODUCTS

2.01 BASE STABILIZER BINDER

- A. Provide a stabilizing organic non-toxic binder, buff in color and without a marked odor. The swell volume shall have a minimum of 35 ml/g with a minimum mucilliod content of 80 percent. The light extraneous matter shall not exceed a maximum of 20 percent with the heavy extraneous matter not exceeding 5 percent. The material shall be screened with 90-100 percent passing a 200 mesh sieve. Base shall be min. 4" deep and compacted to 95% compaction. Base stabilizer binder shall be applied throughout the entire layer of decomposed granite surfacing.

- B. Organic-Lock or equal, provided by:

Envirobond Products Corporation
6191-2100 Bloor Street West
Toronto, Ontario, Canada
M6S 5A5
1-866-636-8476
info@envirobond.com
www.envirobond.com
www.organic-lock.com

2.02 TOP STABILIZER BINDER

- A. Provide an additional top stabilizing agent to a minimum of 1". Use Gator Stone Bond, or equal on foot traffic paths.

2.03 DECOMPOSED GRANITE OR 3/8-INCH MINUS CRUSHED AGGREGATE SCREENINGS

- A. Clean, non-plastic, free from deleterious or foreign matter, natural or manufactured from the crushing and screening of naturally friable granite. Blending of coarse sand with rock dust is not acceptable.
- B. Crushed Stone Sieve Analysis Percentage of Weight Passing:

Square Mesh Sieve AASHTO T011-05-UL and T027-11-UL

Conform to the grading requirements shown below:

SIEVE DESIGNATION	PERCENT PASSING
3/8"	100
No. 4	95-100
No. 8 (2.36 mm)	75-80
No. 16 (1.18 mm)	55-65
No. 30 (0.600 mm)	40-50
No. 50 (0.300 mm)	25-35
No. 100 (0.150 mm)	15-20
No. 200 (0.075 mm)	10-15

- C. Acceptable local supplier: Southwest Boulder & Stone, Fallbrook, California (760) 451-3333, or Gail Materials, Riverside, CA, 951-667-6106, or approved equal.

2.04 WEED CONTROL FABRIC

- A. Acceptable Manufacturers: Note – needle punched material is unacceptable.
1. Typar #3401 thermally spunbonded polypropylene, non-woven, thin geotextile weed control fabric, 4.0 oz/lineal yard weight.
 2. Mirafi TenCate N Series, non-woven polypropylene geotextile.
 3. CSI Geotextile Fabric, polypropylene, non-woven, weed control fabric.

PART 3 - EXECUTION

3.01 SUBGRADE PREPARATION

- A. Subgrade that is to receive decomposed granite shall be prepared immediately prior to placing of surfacing. After area to be paved is brought approximately to required grades, scarify to a minimum depth of 6 inches.
- B. After scarifying, loosened material shall be worked to a finely divided condition and the moisture content brought to optimum by the addition of water, by the addition and blending of dry, suitable material or drying of existing material. Subgrade shall then be compacted to at least 95% standard Proctor density per ASTM D698 -12. Re-grade high and low areas to a uniform grade.
- C. No placement of decomposed granite surfacing material shall be allowed until approval of subgrade by the Engineer.

3.02 INSTALLATION

- A. Blending Base stabilizer: Blend a minimum 16 lbs. of stabilizer binder per ton of decomposed granite or crushed 3/8" minus aggregate screenings. It is critical that Stabilizer be thoroughly and uniformly mixed throughout decomposed or crushed 3/8" minus aggregate screenings.
- B. Placement of Decomposed Granite Screenings or 3/8" Crushed Minus Aggregate Screenings: Upon thorough moisture penetration, compact aggregate screenings to 95% relative compaction by compaction equipment such as: double drum roller (2-4 ton) or single drum roller (1000 lbs.) vibratory plate tamp. Do not begin compaction for 6 hours after placement and up to 48 hours. A minimum of 4" of base shall be installed.

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- C. Application of Top Stabilizer: Spread 1" (minimum to reach the proper grade) decomposed granite over compacted base. Rake or screed to the desired level. Apply Gator Stone Bond using a watering can or pump sprayer, apply Gator Stone Bond to the surface at a rate of 10 square foot per gallon. Allow Gator Stone Bond to fully penetrate through the material. While the surface is still damp, but not saturated, compact the surface with a vibratory plate compactor, to a compaction of 95% of ASTM D698-12.
- D. Contractor shall take precaution in compacting decomposed granite or crushed 3/8" minus aggregate screenings when adjacent to planting and irrigation systems.
- E. Repairs and Protection: Remove and replace decomposed granite or crushed 3/8" minus aggregate paving that is damaged, defective or does not meet requirements of this section.
- F. The final surface elevations shall not deviate more than 3/8 in. under a 10 ft long straightedge. Rework to tolerance as required.
- G. The surface elevation of decomposed granite shall be flush with adjacent paving, drainage inlets, concrete collars or headers.

3.03 BLENDING BASE STABILIZER

- A. Blend 16 lbs (call manufacturer for exact blend) of stabilizer per 1-ton of decomposed granite or crushed 3/8" or 1/4" minus aggregate screenings. It is critical that stabilizer binder be thoroughly and uniformly mixed throughout decomposed granite or crushed 3/8" minus aggregate screenings. Bucket blending is not acceptable. Blending with a rake and or shovel is not acceptable.

3.04 FORMS

- A. Concrete, 6" metal or Redwood headers where shown shall be installed prior to placement of crushed stone material. Header shall be realigned as needed in the event it is deformed during placement and compaction.

3.05 WEED CONTROL FABRIC

- A. Fabric shall be installed between the compacted subgrade and crushed aggregate screenings to prevent weeds from growing up through the crushed stone trail; pre-emergent chemicals are to be used prior to installing fabric. Place fabric across the entire surface to receive aggregate; overlap ends of rolls a minimum of 6 inches.

3.06 SOIL BASE STABILIZER

- A. Thoroughly pre-blend stabilizer binder with the 3/8" minus crushed aggregate screenings, at the rate of 16 lbs. of stabilizer binder per ton of aggregate screenings prior to placing of stabilized mix. It is essential that stabilizer binder be mixed thoroughly and uniformly through the crushed aggregate screenings to achieve a successful result. The stabilizer binder locks the fines together, trapping the larger crushed aggregate screenings; stabilizer binder does not act directly on larger aggregate screenings. Blending is best accomplished with a truck-mounted mixer; a portable mechanical mixer may be used. Blend for a minimum of 15 minutes prior to placing on subgrade.
- B. Drop spreading of stabilizer binder over raked crushed aggregate screenings and mixing stabilizer binder by rototilling is not acceptable.

- C. Soil stabilizer shall not be applied during, just prior to, or immediately following rainfall.

3.07 PLACING CRUSHED AGGREGATE SCREENINGS

- A. After pre-blending, place the stabilized crushed aggregate screenings (CAS) on prepared subgrade, and rake smooth using a steel tine rake to desired grade and cross section. Place to avoid segregation, in two layers of 2 inches maximum thickness. Do not apply CAS deeper than 2 inches in one lift. Example: For a 4 inch thickness, apply CAS in two 2 inch lifts.

3.08 WATERING

- A. Water heavily to achieve full depth moisture penetration of the mix. Watering is accomplished using a garden hose with spray nozzle set to a coarse spray; pressure should not disturb leveled trail surface. A one-hour application at a rate of 20 gpm per 1,000 sq. ft. of mix surface seems to achieve the desired full depth moisture penetration. Water activates stabilizer binder; consequently, it is essential that the full depth of Stabilized material is saturated. Test for depth of water penetration by random inspection of cores. After inspection, fill core holes with material removed, smooth and hand tamp to match adjoining surface grade. (Let watered mix stand 6-24 hours until surface water is no longer present; the mix should then be moist but not wet).

3.09 BASE COMPACTION

- A. While the mix is still thoroughly moist, roll with a heavy lawn roller (minimum 225 pounds and maximum 30 inch width), to achieve finish grade and initial compaction. Hand tamp edges around, signposts, tree stakes, etc. Use a heavy (1 ton minimum) small rider, after having initially used the lawn roller, to obtain the desired final dense, smooth, uniform texture.
- B. Do not use wackers or vibratory rollers; the mix will not harden for weeks after vibration.

3.10 TOP STABILIZER APPLICATION.

- A. After completion of base decomposed granite, apply a top coat of decomposed granite as follows: Spread 1" (minimum to reach the proper grade) decomposed granite over compacted base. Rake or screed to the desired level. Apply Gator Stone Bond using a watering can or pump sprayer, apply Gator Stone Bond to the surface at a rate of 10 square foot per gallon. Allow Gator Stone Bond to fully penetrate through the material. While the surface is still damp, but not saturated, compact the surface with a vibratory plate compactor, to a compaction of 95% of ASTM D698-12.

3.11 FINISHING

- A. After finished compacted surface has been achieved, check surface to assure slope is to required grade and cross section.

3.12 INSPECTION

- A. Finished surface of shall be smooth, uniform and solid, with no evidence of chipping or cracking. Dried, compacted material shall be firm all the way through with no spongy areas. Loose material shall not be present on the surface initially. After the first year of use, a minor amount of loose material is expected on the surface.
- B. Loose gravel on the surface, or unconsolidated crushed aggregate screenings below the surface, is evidence of improper bonding due to poor mixing or insufficient watering. Test

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the loose material for adequate stabilizer binder by wetting, then tamping, and allowing it to dry. If the material is still unconsolidated, stabilizer binder did not get mixed adequately throughout the crushed aggregate screenings. If the material now is solid, initial watering was insufficient. Cracking or sponginess is evidence of excess stabilizer binder in the mix.

- C. Unconsolidated areas shall be dug out, and be replaced with new crushed aggregate screenings with a high proportion of fines meeting the grading requirements of Section 2.2 above, pre-blended with stabilizer binder per the procedures listed under Section 3.7A above. Patched areas then shall be wetted thoroughly and rolled smooth. Patching shall be completed prior to any trail smoothing required.
- D. Any significant irregularities shall be smoothed out prior to final acceptance of work. Smoothing shall be accomplished by rewetting/saturating rough areas thoroughly, and then rolling the trail again with a heavy roller (100-1500 lbs. powered walk-behind or small rider). Wackers are not accepted.
- E. Final thickness of completed area shall not vary more than 1/2-inch from dimension indicated. Measurements may be taken by means of test holes taken at random in finished trail surface. Correct any variations in the thickness beyond the allowable 1/2-inch by repeating the procedures listed under Sections 3.7-3.11 above.
- H. Edges of weed control fabric shall not be exposed to view.

3.13 WARRANTY

- A. Provide a 5-year warranty against failure, cracking, separation, spalling, and weed penetration.

END OF SECTION

SECTION 32 16 00

CURBS, GUTTERS, SIDEWALKS, AND DRIVEWAYS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Concrete curbs, gutters, walks and pavements as indicated on the Drawings and specified herein.
- B. Related Sections:
 - 1. Preparation of Finish Grade, Section 31 22 19.
 - 2. For testing requirements refer to Section 01 45 23 - Testing and Inspecting Services.
 - 3. Reinforcing, Section 03 20 00.
 - 4. Concrete, Section 03 30 00.

1.02 QUALITY ASSURANCE

- A. The curbs and gutters shall be staked by a Land Surveyor licensed to practice in the State of California. See Section 01 71 23 - Field Engineering.

1.03 SUBMITTALS

- A. Reinforcing bars certification and concrete mix design.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cement: ASTM C150, Type I; Type II, or Type V, in accordance with the geotechnical report.
- B. Aggregates: ASTM C33. 3/4-inch maximum for 4 inch thick slabs, conforming to CBC, 2019, Title 24, Part 2. Obtain from an approved source to insure uniform quality and grading; deliver so that moisture content variations will not decrease production of reasonably uniform concrete. Do not use aggregates that are reactive with alkalis.
 - 1. 3/4" for Curb and Gutter
 - 2. 3/4" for Broom Finish
 - 3. 3/8" for sandblasted on other exposed aggregates
- C. Reinforcing Steel: Bars, ASTM A615-09b, grade 60. Reinforcing steel shall be minimum of #3's at 18" o.c. each way. WWM is not acceptable. If plans are vague, or if rebar is shown at a lesser on-center or size, at a minimum the field reinforcing shall be #3's at 18" o.c. More stringent requirements may be shown on the plans and details, however, if no field rebar is specifically shown, then the contractor shall assume #3's at 18" o.c. **IN ALL CASES THE MINIMUM OR LARGER/CLOSER SPACED FIELD REBAR MUST BE**

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PROVIDED.**

- D. Dowels - "Speed Dowel" by Greenstreak 1/2" x 12" unless otherwise required by Architect. Use smooth steel dowels.
- E. Curb and Gutter Expansion Joint Filler: Celotex "Flexcell," ½-inch thick or Homex 300, 1/2-inch thick.
- F. Walk and Slab Expansion Joint Filler: ASTM D1751. Equal must be certified by the Green Building Council.
 - 1. Walks and Back of Curb: 1/4" Fiberboard, W.R. Meadows or 1/4" Polyethylene, closed cell expansion joint filler by Deck-O-Foam, or Equal. *Designer to specify either fiberboard or polyethylene depending on application and location.*
- G. Backer Rod - Closed Cell Polyethylene.
- H. Expansion Joint Sealer: Refer to Section 07 92 00, Joint Sealants. Match color of pavement equal to Pecora Dyna Tred.
- I. Water: Clean, fresh and potable.
- J. Truncated Domes – Use Pre-cast Concrete Pavers by Wausau, Style ADA-3, or equal.

2.02 DESIGN REQUIREMENTS

- A. Concrete Design Strength: Concrete for curbs, gutters, walks and pavement shall develop a minimum ultimate compressive strength of 3000 psi and have a water to cement ratio of 0.5 minimum, unless otherwise specified in the geotechnical report. Refer to Section 03 30 00 for all concrete requirements.

2.03 ACCEPTABLE MANUFACTURER

- A. L.M. SCOFIELD COMPANY, Douglasville, Georgia and Los Angeles, California (800) 800-9900 or the appropriate local contact: Eastern Division – 201-672-9051; Western Division – 323-720-3055; Central Division Office – 630-377-5959.
- B. W.R. Meadows, Pomona, CA (800) 342-5976.
- C. Sinak Corporation, San Diego, CA (800) 523-3147.
- D. Greenstreak, St. Louis, Missouri (800) 325-9504.
- E. Other equal manufacturer.

2.04 SEALING COMPOUNDS

- A. Sealing Compound: For food courts: L.M. Scofield Repello; For Site Concrete: Sinak HLQ-125. Repello penetrating sealer - sealing compound shall comply with ASTM C309.

2.05 COLORS – NOT ACCEPTABLE

PART 3 - EXECUTION

3.01 PREPARATION

- A. Base Course: Subgrade shall be smooth, true to line and grade, and shall be tested for required compaction prior to start of placing concrete. Dampen subgrade 24 hours before placing. Reroll as required to smooth, hard, even surface of 90 percent compaction. Wet forms to tighten cracks.

3.02 INSTALLATION

- A. Formwork:
 - 1. Stake rigidly at 4 feet on centers and secure against displacement. Formwork shall not deviate more than 1/2-inch from required vertical positions and 1 inch from required horizontal positions.
 - 2. Carefully set forms to alignment, grade, and required dimensions. Hold forms rigidly in place by stakes, clamps, spreaders, and braces where required to insure rigidity.
 - 3. Apply form release to form lumber in accordance with manufacturer's recommendations.
 - 4. Place joint filler on vertical surfaces in contact with concrete paving.
- B. Reinforcement: Upon completion of base course and formwork, install reinforcement where shown on the Contract Drawings.
 - 1. Clean reinforcement to remove loose rust and mill scale, earth, and other materials which reduce or destroy bond with concrete.
 - 2. Position, support, and secure reinforcement against displacement by concrete placement operations.
 - 3. Place reinforcement to obtain the required coverages for concrete protection.

3.03 APPLICATION

- A. Concrete:
 - 1. Mixing: Transit mix the concrete in accordance with provisions of ASTM C94.
 - 2. Conveying and Placing: Place concrete in accordance with pertinent recommendations contained in ACI 304 and with the following;
 - a. Deposit concrete continuously in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause formation of seams or places of weakness within the section.

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- b. Deposit and consolidate concrete in a continuous operation within the limits of construction joints until the placing of a panel or section is completed.
 - 1) Bring surfaces to the correct level with a straight-edge, and then strike off.
 - 2) Use bullfloats or darbies to smooth the surface, leaving it free from bumps and hollows.
- c. Do not sprinkle water on the plastic surface. Do not disturb the surfaces prior to start of finishing operations.
- d. Do not use concrete which has become non-plastic and unworkable, which does not meet required quality control limits, or which has been contaminated by foreign materials.

3.04 CONTROL JOINTS

- A. Tops of joint shall be installed flush with the concrete surface. Depth of joint shall be a minimum of 1/4 the thickness of slab. Use control joints on curbs, curbs and gutters, and cross gutters at maximum intervals of 20 feet on center. Sawed joints may be used in lieu of the above upon Architect's written approval providing they are at least 1-inch deep.

3.05 FINISHES

- A. Paved areas between buildings will consist of various different finishes such as medium and heavy broom, steel trowel exposed aggregate and rock salt. See architectural drawings for specific type of finish for these areas.
- B. Portland cement concrete paving shall be stable, firm, and slip resistant, and shall comply with **CBC Sections 11B-302 and 11B-403**.
- C. Walks, Pavements, Stairs and Ramps: Portland cement concrete paving and concrete finishes shall have the following broom finishes:
 - 1. Walks (Portland Cement Concrete paving and concrete finishes):
 - a. Slopes Less than 6%: Surfaces with a slope of less than 6 percent gradient shall be at least as slip-resistant as that described as medium broom finish, perpendicular to the direction of travel. (CBC Sections 11B-403.1, 11B-403.2, 11B-403.5.1 Exception 3, 11B-403.5.3, 11B-302.1.)
 - b. Slopes 6% or Greater: Surfaces with a slope of 6 percent gradient shall be slip-resistant as that described as heavy broom finish, perpendicular to the direction of travel. (CBC Sections 11B-403.1, 11B-403.2, 11B-403.5.1 Exception 3, 11B-403.5.3, 11B-302.1.)
 - c. Surface slopes of accessible parking spaces and access aisles shall be the minimum possible and shall not exceed 2% slope in any direction. CBC 2019 11B-502.4

2. Pavement Markings per plans and as specified below:
 - a. Accessible parking spaces shall be located as near as practical to a primary entrance and shall be marked according to CBC 2019 Sections 11B-502.3.3 and 11B-502.6.
 - b. Loading and unloading access aisle shall be marked by a border painted blue. Within the blue border, hatched lines a maximum of 36" on center shall be painted a color contrasting with the parking surface, preferably blue or white. CBC Figures 11B-502.2, 11B-502.3, 11B-502.3.3, and 11B-503.3.
 - c. When blue color is used, it shall conform to Color No. 15092 per Federal Standard 595B.
 - d. Painted lines and markings on pavement are recommended to be 3" wide minimum.
- D. Gutters: Light broom finish with 3 inch wide steel trowel finish at flowlines.
- E. Curbs: Steel trowel finish.
- F. Stair Treads and Nosings: Provide a 2 inch wide, scored and painted line of 70% minimum contrasting color, 1-inch maximum from the edge of the nosing and extending the entire width of each tread.
- G. On-Site Drive Aprons: Heavy broom finish.

3.06 CURING

- A. Comply with 20193, California Building Code, Title 24, Part 2, Section 1905A.9.
 1. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least seven (7) days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
- B. Curing Methods: Perform curing of concrete by curing as herein specified.
 1. Provide moisture-curing by the following methods:
 - a. Keep concrete surface continuously wet by covering with water.
 - b. Continuous water-fog spray.
 - c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4 inch lap over adjacent absorptive covers.
 2. Provide curing and sealing compound to exposed exterior slabs, walks, and curbs, as follows:
 - a. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance

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with manufacturer's directions. Re-coat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

- b. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid, floor hardener, waterproofing, dampproofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting, and other coatings and finish materials, unless otherwise acceptable to Architect.
- C. Concrete slabs and paving shall be properly cured and protected against damage and defacement of nature during construction operations. If weather is hot or surface has dried out, spray surface with fine mist of water starting not later than two hours after final troweling. Surface of finish shall be kept continuously wet for at least ten days. Wetting is considered emergency work and shall be performed on weekends and holidays if necessary.
- D. In lieu of water curing, within 24 hours after finishing, the concrete may be cured with a clear liquid curing compound such as "Sealtight 1100-Clear" by W.R. Meadows or equal applied in accordance with manufacturer's recommendations.

3.07 OFF-SITE CONCRETE WORK

- A. Concrete driveway aprons, street sidewalks, curbs and gutters, etc., indicated to be constructed outside of property lines shall conform to the standards and specifications of the public agency having jurisdiction and shall be subject to inspection by its representative. Obtain and pay for necessary permits. The Owner will pay for inspection fees.

3.08 FIELD QUALITY CONTROL

- F. Flood Tests: Concrete gutters and concrete pavement shall be given a flood test in the presence of the Inspector. Concrete work where water ponds and does not run off in a reasonable amount of time, shall be removed to the nearest score or joint line and replaced to provide proper drainage.

END OF SECTION

SECTION 32 31 13

CHAIN LINK FENCING AND GATES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Chain link fencing, including gates, and hardware and as indicated on the Drawings and specified herein.
- B. Related Sections:
 - 1. Section 03 30 00 – Cast-in-Place Concrete.

1.02 REFERENCE STANDARDS

Work of the section shall conform to the following 2010 California Code of Regulations:

- A. ASTM A53 – Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- B. ASTM A121 – Metallic-Coated Carbon Steel Barbed Wire.
- C. ASTM A123 – Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products.
- D. ASTM A153 – Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- E. ASTM A392 – Zinc-Coated Steel Chain-Link Fence Fabric.
- F. ASTM A491 – Aluminum-Coated Steel Chain-Link Fence Fabric.
- G. ASTM A653 – Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- H. ASTM A1011 – Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
- I. ASTM B117 – Operating Salt Spray (Fog) Apparatus.
- J. ASTM C94 – Ready-Mixed Concrete.
- K. ASTM F567 – Installation of Chain-Link Fence.
- L. FS RR-F-191 - Fencing, Wire and Post, Metal.

1.03 SUBMITTALS

- A. Submit shop drawings showing application to project, including gates. Include plan layout, grid, spacing of components, accessories, fittings, hardware, anchorages, and schedule of components.
- B. Submit manufacturer's product data with printed specifications and installation instructions.
- C. Submit samples.
- D. Manufacturer's certifications of compliance for chain link fabric, posts and rail.

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1.04 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be delivered to the site in an undamaged condition. Carefully store material off the ground to provide proper protection against oxidation caused by ground moisture.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Materials shall be new and products of recognized, reputable manufacturers. Used, re-rolled or re-galvanized materials are unacceptable. Like products shall be supplied by a single source.

2.02 MATERIALS

- A. Fabric: Steel fabric shall be hot-dipped galvanized before weaving with 1.2 ounces of zinc per square foot of surface conforming to ASTM A392, Class I, or aluminum coated in accordance with ASTM A491. Wire shall be 9 gauge, 2 inch diamond mesh, with selvage edges knuckled. Provide 1-3/4 inch diamond mesh at tennis courts and athletic areas. Height as indicated on drawings.
- B. Tension Wire: 7 gauge galvanized spring steel with same galvanizing as fabric.
- C. Framework: Shall conform to FS RR-F-191/3E Class 1, Grade A or B, or Class 3, except as herein modified.
 - 1. Class 1, Grade A pipe shall conform to ASTM A53, except the hydrostatic test shall be waived. Galvanizing shall be in accordance with ASTM A123.
 - 2. Grade B pipe, shall be made from steel complying with ASTM A653 Grade D or ASTM A1011. The exterior surface shall have a hot dipped zinc coating of $1.0 \pm .1$ oz/ft² followed by 15 micrograms/in² min. chromate conversion coating and $.5 \pm .2$ mils of clear acrylic. The interior surface shall be hot dipped zinc coated with a minimum of $1.0 \pm .1$ oz/ft², or shall be a minimum of .5 mils of zinc rich organic coating with a minimum zinc loading of 91%.
 - 3. Class 2 Roll-Formed C-Sections shall be made from steel conforming to ASTM A1011, Grade 45 and shall be galvanized with 1.8 oz. hot dipped zinc in accordance with ASTM A123. The product of the yield strength and the section modulus of framework material shall not be less than that of pipe conforming to ASTM A53.
- D. Top Rail: Steel pipe, 1.660" O.D. weighing 2.27 lb/ft; pass through intermediate post tops and form a continuous compression member from terminal to terminal of each stretch of fence. The pipe shall be in approximately 20 foot lengths and shall be joined with couplings of the outside sleeve type at least seven inches long. Top rail shall be fastened to terminal posts by heavy pressed steel connections stretched along the fence bottom and secured to terminal posts.

2.03 COMPONENTS

- A. 6 Foot High Fence or Less:
 - 1. Line Posts: 1.9" o.d. steel pipe, Class 1 Grade A or B; or 1.875" x 1.625" x 1.85

lbs/ft. Class 3.

2. Corner and Terminal Posts: 2.375" o.d. steel pipe, Class 1 Grade A or B.
3. Provide posts at 10'-0" maximum o.c. Provide top rail and bottom tension wire, as specified herein. Provide bottom rail at athletic areas.

B. 6 to 8 Foot High Fence:

1. Line Posts: 2.375" o.d. steel pipe, Class 1 Grade A or B;
2. Corner and Terminal Posts: 2.875 o.d. steel pipe, Class 1 Grade A or B.
3. Provide posts at 10'-0" maximum o.c. Provide top rail and bottom tension wire, as specified herein.

C. For Fence Heights Over 8 Feet:

1. Line Posts: 2.875" o.d. steel pipe, Class 1 Grade A or B; or 1.875" x 1.625" x 2.28 lbs/ft Class 3.
2. Corner and Terminal Posts: 4.0" o.d. steel pipe, Class 1 Grade A or B.
3. Rails and Bracing: 1.66" o.d., plain end steel pipe, Class 1, Grade A or B; or 1.625" x 1.25" x 1.35 lbs/ft Class 3. Use manufacturer's longest lengths. Join using 6" sleeves.
4. Provide posts @ 10'-0" maximum o.c. Provide top rail and bottom tension wire, as specified herein. Provide mid-rail at 12 feet high fence.

2.04 ACCESSORIES

A. Gates:

1. Gate Frame: 1.90" O.D. steel pipe Class 1, Grade A or B for welded fabrication. Welded or damaged areas shall be cleaned and coated with two coats of zinc rich paint. Provide same fabric as for fence. Install diagonal cross-bracing using 3/8" truss rods.
2. Gate Posts for Swing Gates shall be as follows:

<u>Gate Leaf Width</u>	<u>Gate Post Dimensions</u>
6' or less	2.875" O.D. - 4.64 lbs/ft
over 6' to 12'	4.000" O.D. - 6.56 lbs/ft
over 12' to 18'	6.625" O.D. - 18.02 lbs/ft
over 18' to 24'	8.625" O.D. - 27.12 lbs/ft

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3. Gate Hardware: See Plans for special hardware requirements of Fire Access and Panic hardware per CBC Section 1008.2, 11B-206.5 and 11B-404.1.
 - a. In Path of Travel: Fork type latch lever hardware, locking hardware shall be at +34"-44" above finish floor mount height. Provide 10 inches minimum high, 16 gauge galvanized metal kickplate attached to the bottom of the gate. (No drop rods at gates accessible to disabled persons).
 - b. Gates in the path of travel must comply with exit door requirements (CBC Section 11B-206.5 and 11B-404.1). Specify lever hardware that does not require pinching, grasping, or twisting motion to operate (CBC Section 11B-404.2.7 and 11B-309.4). Provide solid kick plates 10" minimum high 3" maximum from the paving on both sides of the gate, 5 lbs maximum opening pressure and door maneuvering clearances.
4. Fittings and accessories shall be galvanized in accordance with ASTM A153, Table I.
5. Post Caps: Weathertight caps shall be supplied for each post. Shall be cast steel or malleable iron, galvanized. Caps shall have a loop to receive top rail.

- B. Rolling Gates: When rolling gates are indicated, they shall be fabricated and installed complete with tracks, track wheels, double front wheel assembly, locking devices, gate bumpers, etc. Double wheels shall roll on and be supported by a continuous concrete track. Concrete shall be 8 inches thick with two #4 continuous steel reinforcing bars.
 1. Rolling gate posts shall be 2.875" o.d. steel pipe weighing 5.79lb/ft. Guide posts of 2.375" o.d. steel pipe, weighing 3.65lb/ft. shall be installed in line with the gate posts. Line posts to support the tracks shall be spaced not over 5'-0" on center.
- C. Provide 12" wide x 4" deep continuous flush concrete mow strips at all fencing locations.

2.05 FINISHES

- A. Hot Dipped Galvanized. ASTM A153-09 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install framework, fabric, accessories and gates in accordance with ASTM F567, follow the lines, grades, and details as indicated.
- B. Posts shall be set in concrete with the diameter to be four times the largest cross section of the post. The depth shall be a minimum of 24 inches plus an additional 3 inches for each 1 foot increase in fence height over 4 feet. Terminal posts shall be braced on fences 7 feet or above in height, and on fences without top rail, regardless of height.
 1. Provide concrete for setting posts. Refer to paragraph 2.01A. Specification Section 03 30 00, Cast-in-Place Concrete. Portland Cement shall be Type I, II, or V concrete per paragraph 2.01A. Specification Section 03 30 00, Cast-in-Place Concrete, and shall conform to ASTM C150. Concrete aggregates shall conform to ASTM C33. The maximum size aggregate shall be 1-1/2 inch. Mix shall be 1 part cement and 6 parts well-graded aggregate. Dig holes 3 inches deeper than

bottom of post. Make slight crown at top of concrete, 2 inches minimum above finish grade, to shed water.

2. Terminal posts must not have gates hung on them.
 3. Erect fencing straight and plumb, following the finish grade. Place no post in ditches, dips, or mounds.
- C. Remove all excess materials, debris, rocks, dirt, concrete, etc., and rake grade to within 2 inches of the bottom of the fabric. Dispose of all debris and other refuse off-site in a legal manner.

END OF SECTION

33 00 00

UTILITIES

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SECTION 33 10 00

WATER UTILITIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Site domestic water, and fire water service piping and appurtenances from the source of potable water to a point 5 feet outside the building.
- B. Related Work:
 - 1. Site drainage systems
 - 2. Sanitary sewer system
 - 3. Earthwork, trenching and backfilling
- C. Perform work on water mains, fittings, appurtenances, fire hydrants, meters, and related items within the easement to be granted to local Water District "General Specifications and Special Conditions" and "Standard Drawings", current edition. Purchase one set of these documents from the District Office to be maintained on the site for the duration of the work.

1.02 REFERENCED STANDARDS

- A. Perform work except as noted in accordance with applicable provisions of "California Plumbing Code" (CPC), 2019 Edition, and 2019 California Amendments, International Association of Plumbing and Mechanical Officials (IAPMO), Los Angeles, California.
- B. Underground conduit construction shall be in accordance with Section 306 of "Standard Specifications for Public Works Construction" (PWC Spec.), Current Edition, published by Public Works Standards, Inc. (PWSI), Los Angeles, California.

1.03 SUBMITTALS

- A. Procedures: Comply with requirements of Section 01 33 00 – Submittal Procedures.
- B. Submittals: List of materials proposed for use accompanied by manufacturer's latest printed literature with technical data.
- C. Certificates: Submit manufacturer's certification that materials meet specified requirements.
- D. Record Drawings: Provide in accordance with Section 01 78 39 – Project Record Documents, and completion of water service installation.

1.04 QUALITY ASSURANCE

- A. Prior to final acceptance of the work obtain acceptance of the work from the serving utility and submit copies of the Certificates of Completion to the Inspector for forwarding to the Owner.

1.05 SEQUENCING OF LAND SCHEDULING

- A. Install utility mains as soon as conditions permit other facilities and improvements to follow.

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- B. Make installation of fire hydrants and water service laterals for meters and after construction of Portland cement concrete curbs unless otherwise shown on the drawings. Install water gate valve boxes and covers, and adjust to finished grade following completion of the asphaltic concrete pavement.
- C. Install tops of manholes, junction chambers, vaults, boxes, and valve boxes unless otherwise indicated on Drawings, to an elevation 3 inches below rough grade and raise to final elevation after paving.
- D. Coordinate with connections to public water main and to interior water distribution piping.

PART 2 - PRODUCTS

2.01 WATER SYSTEMS COMPONENTS

- A. Water pipe shall be polyvinylchloride (PVC), ANSI/AWWA C900 or ANSI/AWWA C905, 4" or larger.
- B. PVC Schedule 80, Type I Grade I, with a Cell Classification of 12454 as defined in ASTM D1784 for pipes 1" to 3 1/2".
- B. Gate Valves:
 - 1. Provide iron body, bronze mounted, parallel seat, double disc, non-rising stem, bottom or side wedging, and complying with AWWA C500-09 Specifications.
 - 2. Provide 12 inch and smaller with a working pressure of 200 p.s.i. The working pressure and the name of the manufacturer shall be cast in plain letters on the body of the valve.
 - 3. Open by turning counterclockwise.
 - 4. Entire wedging mechanism shall be solid bronze and allow the gates to function properly when water pressure is exerted from either or both directions.
 - 5. Equip valves with flanged or threaded ends.
 - 6. Valve stems shall be solid bronze.
 - 7. Stem nuts shall be solid bronze.
 - 8. Cast or rolled bronze used in the manufacture of gate valves shall contain a zinc content of not in excess of 5 percent and an aluminum content not in excess of 2 percent.
- D. Meter and Detector Check Assemblies: In accordance with local Water District requirements. Detector check assemblies shall be reduced pressure principal backflows only.
- E. Fire Hydrants: Conform to local Water District requirements. Minimum requirements shall be a wet barrel style with a minimum of one 2 1/2" and one 4" outlet. The 4" outlet shall face the fire department access road. All outlets shall be provided with National Standard Threads (NST).
- F. Post indicators shall be UL listed.

- G. The outlets of fire hydrants shall be inspected and approved by the Fire Department. A field coat of paint shall be applied to hydrants after installation.
- H. Check Valves: Swing type spring loaded for 200 p.s.i.g. working pressure, set readily and tightly with the face of the closure elements made of a non-corrodible material such as bronze composition conforming to ASTM B62.
- I. Valve Boxes: Cast iron, slip adjustment type of appropriate size for valve and shall be Alhambra, No. A-3009 or approved equal. Each valve box cover shall have "Water" cast in the top using sharp-faced letters of 1 inch minimum height.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify drawing dimensions with actual field conditions. Inspect related work and adjacent surfaces. Report to Architect conditions which prevent proper execution of this work.

3.02 PREPARATION

- A. Excavate and construct trenches and manholes or other structures forming a part of the pipeline. Trench excavation shall conform to the requirements of Section 31 20 00 – Earth Moving, and shall require the approval of the Soils Engineer.

3.03 CONNECTIONS TO EXISTING MAINS

- A. Where connections are made between new work and existing mains, the connections shall be made by using special couplings (such as Rockwell Clamp and Coupling-Tapping Sleeves, or approved equal), and other fittings to suit the actual conditions. Methods of connections to existing mains shall be as required by local codes.

3.04 PIPE INSTALLATION

- A. Survey Line and Grade: Provide grade controls and survey lines in accordance with Section 01 50 00, Temporary Facilities and Controls.
- B. Pipe Installation: Pipe will be inspected in the field by the Inspector before and after laying. Corrective work shall be approved by the Inspector at no cost to the Owner. Installation of pipe shall conform to the requirements of Section 306-1.2 of the Standard
- C. Backfill and Compaction: Perform in accordance with Section 306-1.3 of the Standard Specifications. In backfilling the trench take necessary precautions to protect the pipe from damage to shifting. Depth of cover minimum 36 inches.
- D. Install concrete thrust blocks against undisturbed soil at bends, tees, crosses, valves, pipe ends and where changes in pipe diameters occur at reducers or in fittings. Also, install thrust blocks at valves 12 inches or larger when installed with rubber gasket joints. Thrust blocks shall be class 420-C-2000 Portland cement concrete, per drawings.
- E. Underground mains and lead-in connections to system risers shall be completely flushed before connection is made to any overhead sprinkler piping. Where underground piping is flushed and not immediately connected to the overhead piping, the riser shall be capped or otherwise protected to prevent debris, dirt, or animals from entering into the underground piping. This must be witnessed by the project inspector.

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- F. Contractor shall provide a completed signed copy of the "Contractor's Materials and Test Certificate for Underground Piping", per NFPA 13, Figure 10.10.1.
- G. All piping and attached appurtenances subjected to a system working pressure shall be hydrostatically tested at 200 psi, or 50 psi in excess of the system working pressure, whichever is greater, and shall maintain that pressure without loss for 2 hours. If a connection is being made to the an existing system, it is the contractor's responsibility to locate all shut off valves, PIV's and any other devise that will inhibit the correct execution of the test or potentially damage any existing systems.
- H. A waterflow alarm test shall be conducted and approved the Project Inspector in accordance with NFPA 13, Sec. 24.2.3.1. An alarm must sound within 5 minutes for local alarm bell.
- I. Inspections are required prior to pouring thrust blocks, hydrostatic testing and during flushing.
- J. Installation, inspection, and testing shall confirm to 2010 NFPA 13, and 2010 NFPA 24.
- K. Unless otherwise approved by DSA, all fire piping shall be a minimum of 6" in diameter. The lowest operating nut shall be a minimum of 18" above grade and the hydrant flange shall be a minimum of 2" above grade. Hydrant flange shall not be more than 4" above grade.
- L. Fire hydrants shall be a minimum of 40-feet from all structures. A keyed gate valve shall be provided for each hydrant.
- M. All ferrous pipe and fittings shall be protected with loose 8 mil polyethylene tube. The ends of the tube and any splices made for T's or other piping components shall be sealed with 2" tape, approved for underground use. All bolted joints shall be cleaned and thoroughly coated with asphalt or other corrosion retarding material after assembly and prior to poly-tube installation.
- N. A 12" bed of clean fill sand shall be provided below and above the pipe (24" total). Sand shall be compacted to 90% of ASTM 1557 modified.
- O. All bolts used for underground connections shall be stainless steel.
- P. Pipe sections between appurtenances and joints shall be backfilled during hydrostatic testing to prevent movement.
- Q. All private hydrants, sprinkler control valves, detector check assemblies, post indicating valves, and fire department connections shall be painted OSIIA Red.
- R. All control valves shall be locked in the open position. Valves shall be monitored if they serve 100 or more sprinkler heads.

3.05 FIELD QUALITY CONTROL

- A. Testing of Pipelines: Perform tests required by governing agencies. Testing shall be performed in accordance with Section 306-1.4 of Standard Specifications. Furnish water, materials and labor for making the required tests. Tests shall be made in the presence of the Inspector. Notify the Inspector at least 48 hours before performing the required tests.

3.06 CLEANING

- A. Upon completion of work, leave the site clean and clear of debris and construction materials, and as specified in Section 01 74 00 – Cleaning and Waste Management.

END OF SECTION

SECTION 33 13 00

DISINFECTING OF WATER UTILITY DISTRIBUTION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes the furnishing of all labor and materials for disinfection of the potable water system. Potable water systems are those systems which carry domestic water from the supply main without isolation of the branch by a backflow prevention device. Install all plumbing fittings and valves necessary to perform the disinfection.
- B. This section also includes the furnishing of all labor and materials to sample water in system following completion of procedure and provide bacteriological analysis of the water.

1.02 QUALIFICATIONS:

- A. Disinfection: Disinfection shall be done by a commercial disinfection company approved by the School District. Submit to the School District's Representative the name of the proposed company for approval.
- B. Bacteriological Analysis: Water testing shall be done by a laboratory approved by the State Department of Health Services. Submit for approval the name of the proposed laboratory as well as the proposed number and location of samples.
- C. Provide a certificate of completion per Part B attached standard chlorination report which denotes the lines disinfected, the concentration applied and the amount and type of disinfection agent used, and that disinfection is in accordance with AWWA C601 and State Health Department requirements.

PART 2 - MATERIALS

2.01 MATERIALS

- A. Use an approved chlorine agent, applied in liquid form into the system being disinfected. Chlorine gas or a hypochlorite solution may be used to make up the disinfecting liquid.

PART 3 - EXECUTION

3.01 PRELIMINARY PREPARATION OF THE SYSTEM:

- A. Provide within 3 feet of the supply main, an injection port for introducing the chlorine solution and a gate valve upstream from the injection port.
- B. There shall be no dead-end sections in the system exceeding 3 feet in length. All branches within the system shall lead to an outlet for bleeding and flushing.
- C. After final pressure tests, open each fixture or outlet to maximum flow and run until the discharge water is free from particulates.

3.02 CHLORINATION PROCEDURE:

- A. Notify the School District's Representative at least five working days prior to the start date of chlorination per Part A attached chlorination report.

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- B. Install all fixtures to be served by the potable water system before start of chlorination.
- C. Prior to injection, place signs on each fixture being treated, reading "Heavily Chlorinated Water - Do Not Use."
- D. Introduce the chlorine into the supply stream at a rate to provide a uniform concentration of chlorine in the entire system. Maintain at least 50 ppm chlorine level at each fixture after a hold period of 24 hours. Do not exceed 150 ppm at any time.
- E. Draw the injected chlorine in the system through each outlet and fixture until the specified concentration level is reached. Then close all valves including the service cock and supply valve. Keep the system closed during the 24 hour hold period.
- F. The School District will require a test for the residual concentration in the system at the end of 24 hours. Release no water from the system until these required samples are taken. A minimum concentration of 50 ppm of chlorine is required at all chosen sampling points.
- G. After approval to proceed, flush the system at a relatively high velocity to remove the injected chlorine to a concentration in the system of no more than 0.5 ppm above that in the normal supply.
- H. After approval to proceed, secure the entire system for at least three days prior to taking samples for bacteriological analysis.

3.03 SAMPLING AND NOTIFICATION:

- A. At the completion of the three day hold period, take bacteriological water samples with observation by the School District's Representative.
- B. Sample bottles must be provided by the approved laboratory. After the samples have been collected, the School District's Representative may allow temporary use of the water system pending results of the bacteriological analysis of the samples. The system cannot be used unless such allowance in writing is given.
- C. Upon completion of sampling, submit the certificate of completion to the School District Representative for approval.

3.04 ANALYSIS:

- A. Perform qualitative and quantitative bacterial analysis on the water samples and submit a laboratory report. The report must include the presence of any E. Coli bacteria in a 100 ml sample (this must be negative to be acceptable) and a total plate count of bacteria per cc of the sample (this must be less than 100, or equal to the supply).

3.05 FINAL ACCEPTANCE:

- A. Upon satisfactory completion of all procedures and receipt of acceptable bacteriological results, written approval of the system will be provided by the School District's Representative per Part C attached standard chlorination report. Failure to fully comply with the above procedures will result in a requirement to repeat the procedure until acceptable results are achieved, at no additional cost to the School District.

END OF SECTION

SECTION 33 41 00

**SANITARY SEWER AND STORM DRAINAGE PIPING (12" and below)
(THIS SPECIFICATION MUST BE MODIFIED IF PVC PIPE IN EXCESS OF 12" IS
SPECIFIED FOR SANITARY OR STORM SEWER)**

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. These specifications designate the requirements for the furnishing and installing underground PVC gravity pipe for storm drain and sewers.

1.02 REFERENCED STANDARDS:

- A. The editions and specifications and standards referenced herein, published by the following organizations apply to the construction only to the extent specified by the reference.
 - 1. Standard Specifications:
 - a. Standard Specifications for Public Works Construction, The Green Book, Current Edition.
 - b. Standard Special Provisions of the Regional Standards Committee.
 - c. City of San Diego Standard Specifications for Public Works Construction.
 - 2. Standard Drawings:
 - a. City of San Diego Standard Drawings, Current Edition.
 - 3. American Water Works Association (AWWA).
 - 4. UNI-BELL PVC Pipe Association (UNI).

1.03 SUBMITTALS:

- A. Submit manufacturer's catalog data on pipe to be supplied.
- B. Contractor shall provide a video tape to Project Manager after installation.

PART 2 - MATERIALS

2.01 PIPE MATERIALS

- A. POLYVINYL CHLORIDE PIPE (PVC) AND FITTINGS:
 - 1. Pipe and Fittings: Shall conform to ASTM D3034, shall be SDR 35, with ends suitable for elastomeric gasket joints. Pipe shall meet requirements of UNI-B-15-10. Main Supply lines shall be 4" minimum. Service lines shall be sized for usage.
 - 2. Joints and Jointing Material: Utilize an integral bell and spigot with a solid cross section rubber gasket. Joints shall conform to ASTM D3212. Gaskets shall conform to ASTM F477.

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3. Clean outs: Same material as sewer pipe with a PVC threaded fitting and riser. Clean outs are to have concrete collar and be located in easily accessible locations. Clean outs shall be set flush.
 4. Pipe Stiffness: Minimum pipe stiffness (@ 5% deflect) shall be 46 for all sizes when tested in accordance with ASTM D2412.
 5. Flattening: There shall be no evidence of splitting, cracking, or breaking when the pipe is tested as follows:
 - a. Flatten specimen of pipe, six inches long between parallel plates in a suitable press until the distance between the plates is forty percent of the outside diameter of the pipe. The rate of loading shall be uniform and such that the compression is completed within two to five minutes.
 6. Products: Ringtite greenbell PVC sewer pipe, Johns-Manville, Denver, Colorado; Fluidtite PVC sewer pipe, Certainteed Corporation, Anaheim, California; or equal.
- C. Bedding – Bedding shall be 12" of sand per the Green Book, current edition.
- D. Concrete Manholes – 48 inch or 60" diameter pre-cast concrete manhole with eccentric entrance cone and grade rings as specified in the Standard Specifications of the **Local Water District**. Larger manholes may be required as indicated on the Plans. Seal all manholes and water test.

PART 3 - INSTALLATION

3.01 TRENCHING AND BACKFILLING

- A. Trenching and backfilling shall be per Section 31 23 00 – Excavation and Backfill.

3.02 STORAGE OF MATERIALS:

- A. Inspect all materials delivered to the site for damage. Store materials on site in enclosures or under protective covering out of direct sunlight. Do not store materials directly on ground. Keep inside of pipes and fittings free of dirt and debris.

3.03 INSTALLING JOINTS:

- A. Apply the joint manufacturer's lubricant to the pipe spigot to assemble the joint. Follow the manufacturer's instructions. Make joints water tight and root tight.
- B. All connections to mainline shall be at a 45 degree angle, or greater.

3.04 INSTALLING THE PIPE:

- A. Install pipe in accordance with ASTM D2321, UNI-B-5-89 and the following:
1. Inspect each pipe and fitting before lowering the pipe or fitting into the trench. Clean ends of pipe thoroughly. Remove foreign matter and dirt from inside of pipe and keep clean during and after laying.
 2. Use implements, tools, and facilities for the safe and proper protection of the pipe. Handle pipe in such a manner as to avoid any physical damage to the pipe. Do not

drop or dump pipe into trenches under any circumstances.

3. When installing piping in trenches, do not deviate more than 1 inch from line or 1/4 inch from grade. Measure for grade at the pipe invert.
4. Grade the bottom of the trench to the line and grade to which the pipe is to be laid, with allowance for pipe thickness. Remove hard spots that would prevent a uniform thickness of bedding. Before laying each section of the pipe, check the grade with a straightedge and correct any irregularities found. The trench bottom shall form a continuous and uniform bearing and support for the pipe at every point between bell holes, except that the grade may be disturbed for the removal of lifting tackle.
5. At the location of each joint, dig bell (joint) holes in the bottom of the trench and at the sides to permit visual inspection of the entire joint.
6. Provide and maintain means and devices at all times to remove and dispose of all water entering the trench during the process of pipelaying. The trench shall be kept dry until the pipelaying and jointing are completed.
7. When the pipelaying is not in progress, including the noon hours, close the open ends of pipe. Do not permit trench water, animals, or foreign material to enter the pipe.
8. Lay pipe without break, upgrade from structure to structure, with the bell ends of the pipe upgrade.
9. Do not use the pipe as a drain for removing water that has infiltrated into the trench.
10. After joint assembly, bring the bedding material up to 1 foot above the top of the pipe. Place and compact the imported sand as directed in Section 31 23 00. The remainder of the backfill shall be native earth backfill, installed per Section 31 23 00.

3.05 TESTING FOR ALIGNMENT:

- A. After the pipe has been installed, tested for leakage, backfilled to existing grade, and manholes raised to grade and resurfaced, "ball" the pipe from manhole with a sewer scrubbing ball. After balling the pipe, perform the following.
- B. "Mirror" straight sewers and inlet/outlet ends of curvilinear sewers. Perform balling and mirroring in the presence of the School District's Representative to test for alignment, grade, damage or defective pipe in place, or any other type of faulty installation. Should balling and mirroring indicate any faulty installation of the pipe, repairs or replacements shall be made at the Contractor's expense.

3.06 LEAKAGE TEST (SEWER ONLY):

- A. Test for leakage by means of a water test. Test each section of pipe between manholes, along with the manholes.
- B. Even though a section may have previously passed the leakage test, test each section of sewer subsequent to the last backfill compacting operation in which heavy compaction

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equipment may have damaged or affected the required watertight integrity of the pipe, structure, or appurtenance.

3.07 WATER TEST (SEWER ONLY):

- A. Test each section of pipe between two successive structures by closing the lower end of the pipe to be tested and the inlet pipe of the upper structure with plugs or stoppers. Fill the pipe and structure with water to a point 4 feet above the invert of the open pipe in the upper structure, or to a height of 10 feet above the invert of the sewer in the lower structure, whichever gives the less hydrostatic pressure on the lower structure.
- B. The total leakage shall be the decrease in volume of water in the upper structure. The leakage shall not exceed 0.025 gpm per inch of nominal diameter of pipe per 1,000 feet of sewer pipe being tested. Do not use the length of lateral connections in computing the length of pipe being tested.
- C. If the leakage is greater than allowed, overhaul the pipe and, if necessary, replace and relay until the joints and pipe comply with this test. Complete tests before trench is paved.

END OF SECTION

SECTION 33 44 00

STORM WATER DRAINS (LARGER THAN 12" IN DIAMETER)

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Completion of storm drain lines and related storm drain structures as indicated on the Drawings and specified herein. All items in this specification must be submitted for architect's review and approval:
 - 1. Pipe Materials
 - 2. Trenching-Backfilling-Compaction
 - 3. Laying Pipe
 - 4. Drainage Structures
- B. Related Sections:
 - 1. Concrete, Section 32 16 00 – Curbs, Gutters, Sidewalks and Driveways.
 - 2. Compaction for Backfilling, Section 31 23 00 – Excavation and Fill.
 - 3. Reinforcing Steel, Section 03 20 00 – Concrete Reinforcing.
 - 4. Section 03 30 00 – Concrete.

1.02 REFERENCE STANDARDS

- A. The work specified in this section shall be performed in accordance with Section 303 and 306, latest edition of the Standard Specifications for Public Works Construction.
- B. Construction of storm sewers and appurtenances shall be in accordance with the applicable sections of the Standard Specification for Public Works Construction.
- C. Open Trench Operations: Trench excavation and backfill necessary for the installation of the storm sewerage main and appurtenances shall be done in accordance with Section 306, latest edition of the Standard Specifications for Public Works Construction, as noted in the Special Provisions.

1.03 PERFORMANCE REQUIREMENTS

- A. Storm drains shall be staked by a Land Surveyor licensed to practice in the State of California.

1.04 QUALITY ASSURANCE

- A. All catch basins and manholes and related structures and devices indicated as public agency standards shall be constructed in accordance with the standard plans and specifications of that agency.
- B. Where connections are made to existing public drainage systems, they shall be made in accordance with the instructions or specifications of the authority having jurisdiction and in the presence of a representative of that agency.
- C. Where drain lines, drainage structures, and appurtenances are constructed in public streets or rights of way, they shall be constructed in accordance with the standard plans and specification of the authority having jurisdiction and in the presence of a representative of that agency.

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- D. Secure necessary permits for work performed under conditions which exist in Items above. The Owner will pay for inspection fees and permits connected therewith.
- E. Upon completion of the work, the Contractor shall provide the Architect with certified proof that the work performed is as described in Section 1.04, Items A, B. and C. above; and has been inspected, approved and accepted by the governing agency having jurisdiction.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Protection:
 - 1. The Contractor shall be responsible to furnish and maintain temporary barricades, warning lights, and other types of protection and to prevent accidental injury to the general public and personnel employed on the project.
 - 2. Provide adequate cribbing, sheathing, and shoring as necessary to safely retain the earth sides of excavations and trenches from caving and other damage resulting from excavating, together with suitable forms of protection against property damage and bodily injury to personnel employed on the work and the general public. Contractor to be responsible for the design, installation, and maintenance of required cribbing and shoring, and shall meet the approval of the Cal/OSHA and local governing agency requirements.
 - 3. Drain lines, including trenches, shall be protected from damage during the entire construction period. Be responsible to replace or rework damaged portion of the work at no cost to Owner.

PART 2 - PRODUCTS

2.01 PIPE MATERIALS

- A. Contractor's Option: The Contractor shall have the option of using reinforced concrete pipe, cast iron pipe, HDPE pipe, or polyvinylchloride pipe for those storm drain lines indicated on the drawings where no specific type is called for. Cast iron pipe shall be used where indicated and also where storm drain lines are within five feet of walls and where lines have less than 12 inches of cover. Reinforced concrete pipe shall also be used where indicated.
 - 1. Reinforced Concrete Pipe: In compliance with the American Concrete Pipe Association. Strength as indicated on the drawings, or as determined by engineer. All pipe shall be gasketed pipe creating a water tight installation.
 - 2. Cast Iron Pipe: Service weight, hubless, coated, cast iron pipe and fittings in compliance with ASTM A74-09, latest revision.
 - 3. HDPE pipe: ADS Pro Link WT with bell/bell non-cleated coupler with O-ring gasket for 12" - 24" and non-cleated integral welded coupler with o-ring gasket for 30" and above, or equal. Joints must meet ASTM D3212 lab test and ASTM F1417 watertight field test. ADS Series 35 couplers must be used when going from HDPE pipe to PVC pipe.
 - 4. Polyvinylchloride Pipe:
 - a. Solid Wall P.V.C. – SDR 35 with elastomeric gasket joints.

- b. P.V.C. plastic pipe for storm sewer mains shall be manufactured in accordance with ASTM D2729-11.
- B. Pre-Cast Concrete Catch Basin:
1. If catch basin grate is located in walking surfaces, grates to have maximum 1/2" openings perpendicular to path of travel per CBC 1133B.7.2. If grates have elongated openings, the grate shall be placed so the long dimension is perpendicular to the dominant direction of travel.
 2. Pre-cast concrete catch basin as manufactured by Brooks Products, Inc., San Diego Precast, or equal. Provide types and sizes as indicated on drawings, with traffic rated gate and frame, or equal. Grate and frame must be designed for HS20 loading.
 3. All catch basins must have a cast in place concrete bottom, formed to line and grade of the incoming and outgoing pipes. Absolutely no "wye" connections.
- C. Pre-Cast Concrete Manhole: 48 inch diameter pre-cast concrete manhole with eccentric entrance cone and grade rings as specified in the Standard Specifications of the **Local Water District**. Larger manholes may be required as indicated on the plans. All manholes shall have cast in place concrete bottoms, formed to line and grade of incoming and outgoing pipes. All manholes shall be sealed in accordance with ASTM 2414.
- D. Concrete:
1. Concrete for catch basins, culverts, and other drainage structures shall be 3000 psi concrete at 28 days and conform to the concrete specification 03 30 00.
 2. Prefabricated Drainage Structures: In accordance with Drawings.
- E. Full Capture Drain Inserts – Install full capture drain inserts in all catch basins. Use Triton, by CONTECH Construction Products, Inc. or equal.

PART 3 - EXECUTION

3.01 TRENCHING

- A. Excavate trenches per requirements stated in paragraph 1.03, Protection. Accurately shape and thoroughly compact trench bottom to grade. Excavate joint space when bells are used, so that the lowest 1/3 of pipe has firm bearing for its entire length. Lay pipe to lines and grades indicated with sections close jointed to form a smooth flow line. Keep trenches clean until installed work has been approved.
- B. Compaction shall be performed and comply with the related requirements of Section 31 23 00 – Excavation and Fill.

3.02 LAYING PIPE AND JOINTS

- A. The installation of pipe for the storm sewerage system shall be as specified in Section 306, latest edition of the Standard Specifications for Public Works Construction, and as shown on the Plans.
- B. Lay pipe to lines and grades indicated with sections close jointed to form a smooth flow line. All connections to mainlines shall be made at a 45 degree angle, or greater.

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- C. Bedding material shall be clean sand as defined by Standard Specifications for Public Works Construction, current Edition (Green Book) Section 200-1.5, extending from 4-inches thick beneath the pipe to 12 inches above top of pipe. Place sand simultaneously on each side of the pipe, and thoroughly compact to provide lateral support for the line. Place remaining backfill in 6-inch layers above top of bedding material, moisten as required and compact with hand or pneumatic tampers. Compacting by flooding is prohibited.
- D. Lay bell, hub or groove ends up-grade; accurately center the following spigots in them.
- E. Reinforced Concrete Pipe: Lay pipe in accordance with APWA standards. Laser profile all RCP. Laser profiling should be conducted in accordance with NASSCO's Specification Guidelines SG-1.
- F. Polyvinylchloride Pipe: Lay and bed in accordance with ASTM D2321.
- G. Cast Iron Pipe: MG cast iron couplings with stainless steel bolts.
- H. HDPE pipe: Lay and bed in accordance with Green Book specifications, and these specifications.
- I. Unless otherwise indicated, lateral connections to main lines and angles in lines shall be made with the use of 45 degree wyees. 90 degree intersections are prohibited.
- J. Provide temporary caps, etc., during progress of work to prevent dirt or other debris from blocking lines.
- K. Provide running water test of system observed by an Inspector.

3.03 DRAINAGE STRUCTURES

- A. Construct reinforced concrete outlet boxes shall be constructed in accordance with Section 03 30 00 of these specifications at the dimensions and at the places shown on the Drawings.
- B. Manhole frame and cover, opening frame and anchors, ladder rings shall be as specified in the latest edition of the Standard Specifications for Public Works Construction.
- C. Construct to design and elevations indicated. Exposed concrete work shall have a smooth troweled finish with rounded corners and edges finished plumb and true. Provide grates, frames and covers for catch basins as detailed and indicated.
- D. Forms for concrete drainage structures shall be rigid and substantial. Plywood or tongue and grooved lumber shall be used for forming the exposed faces of concrete drainage structures. The top surfaces of the concrete shall be finished by bringing mortar to the surface by tamping, troweling smooth, and tooling the edges.
- E. Forms shall be kept in place not less than five days after placing unless otherwise directed or approved. Concrete work shall be cured by keeping it continuously wet for not less than seven days after placing.

3.04 INSTALLATION OF PIPE CLEAN-OUTS

- A. Install clean-outs at the places and at the sizes shown on the Plans.

- B. Clean-outs shall be installed in accordance with standards of the local Water District.

3.05 INSTALLATION OF BOX-TYPE CATCH BASINS

- A. Boxes shall be installed true to line and grade. Pipe shall be installed in the knock-out holes and grouted in place.
- B. The pipe shall be neatly trimmed to a flush surface with the inside wall of the box and the grout shall be finished flush with the inside wall of the box.
- C. A 12 inch wide by 4 inch thick Portland Cement concrete collar shall be placed around each of the inlet and outlet boxes. The collars shall be placed with the finished surface flush with the top of the boxes. Each collar shall receive a broom finish.

3.06 CONSTRUCTION OF OUTLET BOX

- A. Construct reinforced concrete outlet box where indicated on the Drawings.
- B. Install galvanized frames and grates where specified on the Drawings.

3.07 CLEAN-UP

- A. Upon completion of the work, storm drain systems shall be left free from silt, debris and obstructions.

END OF SECTION

SECTION 33 44 19

UTILITY STORM WATER TREATMENT (THIS SPECIFICATION MUST BE EDITED SPECIFICALLY FOR EACH PROJECT)

PART 1 – GENERAL

1.01 SUMMARY

- A. This section outlines actions required reduce water quality impacts from all construction activities and to achieve and maintain compliance with the California General NPDES Permit for Discharges Associated with Construction Activities where applicable. The work includes preparation and maintenance of a Storm Water Pollution Prevention Plan (SWPPP) or Water Pollution Control Plan (WPCP) and implementation and maintenance of storm water pollution prevention Best Management Practices (BMPs) required to control discharges to the storm water conveyance system. These requirements shall apply to all construction related areas and activities associated with the project, such as staging areas, equipment and material storage sites, waste management areas, and borrow pit operations which may be outside the construction limits.
- B. Related Documents
 - 1. Section 31 10 00 – Site Clearing.
 - 2. Section 31 20 00 – Earth Moving.
 - 3. Section 33 41 00: Storm Drainage

1.02 REFERENCES

- A. State Water Resources Control Board (SWRCB) Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System (NPDES), General Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Storm Water Runoff Associated with Construction Activity (General Construction Storm Water Permit) as amended, and/or modified
http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/wqo2009_0009_dwq.pdf.
- B. City of San Diego Storm Water Ordinance (San Diego Municipal Code §43.03, *Storm Water Management and Discharge Control*). This ordinance prohibits non-storm water discharges into the City's storm water conveyance system, including disposal of construction-related pollutants or sediments into the street gutter or storm drain (<http://clerkdoc.sannet.gov/Website/mc/mc.html>).
- C. California Storm Water Best Management Practices Handbook - Construction, January 2003, published by the California Stormwater Quality Association (www.cabmphandbooks.com).
- D. Caltrans Construction Site Best Management Practices Handbook, March 2003 (www.dot.ca.gov/hq/oppd/stormwtr/).

1.03 SUBMITTALS

- A. For projects with total disturbed soil area \geq one acre:
 - 1. Prior to the start of construction, the Contractor shall submit a SWPPP meeting the requirements of the current General Construction Storm Water Permit for all applicable phases of construction, including but not limited to: clearing, grading,

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excavating, filling, construction, paving, finish work and landscaping.

2. Based on the complexity of the project, the District may elect to have the District's architect or design engineer prepare the SWPPP prior to the Contractor bid process. In this event the SWPPP shall be included in the bid specification for the Contractor. The Contractor may elect to make modifications to the SWPPP prior to construction. If the Contractor elects to modify the SWPPP, the modifications shall be submitted for review and approval by the District thirty days prior to construction. Modifications shall be subject to the review and approval of the District Project Manager or Construction Manager.
 3. SWPPPs shall be prepared by Contractor personnel or a subcontractor familiar with pollutant identification and storm water BMPs. If the District elects to have the SWPPP prepared prior to the bid process, the District's architect or design engineer may select an independent qualified engineer or qualified subcontractor to prepare the SWPPP. At a minimum, the preparer shall have completed at least 8 hours of training in construction storm water BMPs at courses offered by the Association of General Contractors, the Engineering General Contractors Association, local regulatory agencies, the International Erosion Control Association or other organizations acceptable to the District. Alternatively, the preparer shall be registered as a Certified Professional in Erosion and Sediment Control (CPESC) or a Professional Civil Engineer.
 4. The SWPPP shall include, but not be limited to, site information, identification of potential pollutants, and identification of appropriate storm water pollution prevention BMPs to be utilized by the Contractor throughout the duration of the project, designed to prevent unauthorized discharges. The SWPPP shall also include provisions for BMP maintenance, inspection, and repair and employee training. SWPPP BMPs shall include erosion and sediment controls, non-storm water management controls, materials and waste management controls, and post-construction storm water management controls. The SWPPP shall also include site plans with details of appropriate BMPs to be implemented and their locations for each phase of work. As with the SWPPP itself, these site plans must be updated as necessary when changes occur.
 5. The SWPPP shall include Sampling and Analysis Plans (SAPs) for non-visible pollutants and sediment (for any sites which discharge directly to water bodies that are 303(d)-listed as water quality impaired for sediment, siltation or turbidity – see the website referenced in Section 31 10 00, Item 1.02, A for more information).
 6. The Contractor is responsible for preparing the Notice of Intent, Annual Compliance Certification and Notice of Termination for signature by the District and District submittal to the SWRCB.
 7. The Contractor shall provide a complete copy of the SWPPP including all amendments and monitoring data (inspection reports and laboratory analysis reports) to the District upon completion of the project.
- B. For projects with total disturbed soil area < one acre or no disturbed soil area:
1. Submit the name, title, work phone number and emergency phone number for the Contractor's designated person responsible for storm water pollution prevention. This person must be at the site throughout the project and will be responsible for ensuring compliance with requirements of this section. This person is also responsible for notifying the District of any non-compliance.

2. Submit a WPCP that identifies potential construction-related pollutants and BMPs that will be used to prevent pollutants from discharging to the storm drain system. The WPCP shall include a site map identifying the direction of runoff flow, storm drain inlets or other off-site runoff discharge locations, areas of work, staging areas, construction site access points, and location where BMPs will be applied.
- C. SWPPP and WPCP Approval - The Contractor shall submit the SWPPP or WPCP at least thirty days prior to the scheduled start of construction to allow time for District review and approval. Work shall not be started until the SWPPP has been acknowledged by the Chief Operating Officer of the District and accepted by the District Project Manager or Construction Manager. Subsequent modifications and amendments to the SWPPP and WPCP are subject to the review and approval of the District Project Manager or Construction Manager.
 1. If the District's architect or design engineer prepares the SWPPP, the SWPPP shall be submitted at least thirty days prior to the scheduled Contractor bid process to allow time for District review and approval. The SWPPP shall be approved by the Chief Operating Officer of the District and accepted by the District Project Manager or Construction Manager.
- D. Other Submittal procedures and quantities are specified in Section 01 33 00.

1.03 RESPONSIBILITIES OF THE DISTRICT

- A. The District shall be responsible for signing and submitting the Notice of Intent, Annual Compliance Certification and Notice of Termination to the SWRCB along with submittal of standard annual permit fees.
- B. The District shall be responsible for maintaining a copy of the NOI, SWPPP (provided by the Contractor upon completion of the project), and NOT and other associated documents in accordance with "Retention of Records" provisions of the General Permit.

PART 2 – PRODUCTS

2.01 GENERAL

- A. Products shall be as shown in the SWPPP or WPCP and specified in the publications listed in Section 31 10 00, Item 1.02.
- B. The Contractor shall have adequate materials on site to quickly deploy BMPs to protect the exposed portions of the site and to prevent sediment and pollutant discharges from the site.
- C. Erosion control BMPs may include but are not limited to: scheduling, slope roughening, preservation of existing vegetation, hydraulic mulches, temporary seeding, soil stabilizers and binders, bonded fiber matrix (BFM), erosion control blankets, and plastic covers. Temporary sediment control BMPs may include but are not limited to linear sediment barriers (e.g., silt fence, fiber rolls, gravel bag berms), sediment traps, storm drain inlet protection, tracking controls, and dust control. Non-storm water management BMPs may include but are not limited to: pavement cutting, vehicle and equipment cleaning, vehicle and equipment fueling and maintenance. Materials and Waste Management BMPs may include but are not limited to: material storage, stockpiles, spill prevention and control, clean up, and concrete waste management.

PART 3 – EXECUTION

3.01 GENERAL

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- A. Comply with all provisions of the State Water Resources Control Board, National Pollutant Discharge Elimination System (NPDES), General Permit No. CAS000002, including requirements to collecting and analyzing storm water samples for non-visible pollutants and sediment/siltation, as described in the permit and as applicable to the project.
- B. Comply with all provisions of the City of San Diego Storm Water Ordinance (San Diego Municipal Code §43.03, *Storm Water Management and Discharge Control*).
- C. Allowable Non-Storm Water Discharges: In accordance with the City of San Diego Storm Water Ordinance, the following non-storm water discharges to the storm drain system (including canyons and creeks) are allowable upon the condition that the discharges do not cause or contribute to the violation of any Plan Water Quality objective and are not a significant source of pollutants:
 - 1. Water line flushing and other discharges from potable or raw water supply sources.
 - 2. Landscape irrigation and lawn watering.
 - 3. Rising ground waters or springs.
 - 4. Uncontaminated pumped groundwater not subject to any applicable NPDES permit.
 - 5. Passive foundation and footing drains.
 - 6. Water from crawl space pumps.
 - 7. Air conditioning condensation.
 - 8. Non-commercial and residential washing of vehicles.
 - 9. Flows from riparian habitats and wetlands.
 - 10. Dechlorinated swimming pool discharges.
 - 11. Flows from fire fighting.

To assure that allowable non-stormwater discharges do not become a significant source of pollutants, the SWPPP or WPCP must identify the BMPs that will be implemented to control the discharge. The purpose of such BMPs is to prevent the allowable non-stormwater discharges from picking up and conveying pollutants from sources that may be in the discharge flowpath. Additionally, wherever feasible, alternatives that would not result in discharge of allowable non-stormwater discharges should be implemented.

- D. Prohibited Non-Storm Water Discharges: All other discharges to the storm drain system are prohibited including but not limited to: process and wash waters, dust, petroleum products, soil or sediment, litter or debris, paint or other construction-related wastes or materials. The Contractor shall be responsible for clean-up, mitigation, and penalties resulting from failure to implement and maintain appropriate BMPs for pollution prevention.

3.02 IMPLEMENTATION OF STORM WATER BMPS

- A. The Contractor shall implement appropriate BMPs to prevent and/or control potential discharges and to protect the storm water conveyance system from any and all activities with the potential to release materials directly or indirectly into the storm water conveyance system.
- B. Details and working drawings for BMPs are provided in the references listed in Section 03 10 00, Item 1.02. The Contractor shall provide an effective combination of Erosion and Sediment control BMPs, Non-Storm Water Management BMPs, and Materials and Waste Management BMPs.
- C. For projects with total disturbed soil area \geq one acre:
 - 1. Implement approved SWPPP as submitted per Section 31 10 00, Item 1.03, A.
- D. For projects with total disturbed soil area $<$ one acre:
 - 1. Implement approved WPCP as submitted per Section 31 10 00, Item 1.03, B.

3.03 TRAINING

- A. Contractor shall ensure that training on this special condition is given to all employees and subcontractors involved in construction activities. This training shall include but not be limited to the location of the storm drains on the job site; the direct link between the storm drain system and the bay; potential pollutants; and BMP installation, inspection, maintenance and repair.

3.04 NOTIFICATION

- A. The Contractor shall notify the Project Inspector/Construction Manager immediately of any unauthorized releases to the storm drain. The Contractor shall immediately document all unauthorized releases including but not limited to the time, date and duration, material released, and action taken to stop discharge and prevent future discharges. Documentation shall be provided to the Engineer and included in the SWPPP.

3.05 MAINTENANCE, INSPECTION, AND REPAIR OF BMPS

- A. The Contractor shall inspect BMPs before predicted rain events, and after rainfall. For prolonged events, greater than 24 hours, the Contractor shall inspect BMPs during the rain storm.
- B. The Contractor shall inspect BMPs in accordance with procedures identified in the references identified in Section 31 10 00, Item 1.02.
- C. The Contractor shall closely examine each BMP for 1) structural integrity; 2) sediment accumulation greater than 1/3 total depth; 3) evidence of excessive sediment downstream of BMPs or the site; and 4) evidence of other construction materials washed off-site.
- D. If a selected BMP fails or requires maintenance, it shall be maintained, repaired, modified, or replaced with an acceptable alternate as soon as it is safe to do so.

3.06 AUTHORITY OF THE ENGINEER

- A. The Engineer of Record/Architect of Record or Storm Water Manager has the authority to limit the surface area of soils exposed by clearing and grubbing, excavation, borrow and

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fill operations, and to direct the Contractor to provide immediate permanent or temporary BMPs to minimize pollutant transport. The Engineer has the authority to require BMPs to be installed or maintained by the Contractor at any time and to stop or delay work that could result in pollutant transport, until such time as the Contractor provides adequate BMP protection.

PART 4 - MEASUREMENT AND PAYMENT

4.01 Storm Water Pollution Prevention will be paid for at the Contract lump sum amounts for the below items:

- A. Preparation of the SWPPP
- B. Construction BMPs
- C. Inspection of Construction BMPs
- D. Maintenance of Construction BMPs
- E. Collection and Analysis of Storm Water Samples

These amounts shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals and for doing all the work of these items, complete in place, including cleanup, as specified in these Specifications.

END OF SECTION

SECTION 33 46 13

FOUNDATION DRAINAGE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Prefabricated drainage membrane systems for below-grade vertical applications, as indicated on the Drawings and specified herein.
- B. Related Sections:
 - 1. Section 04 22 00 – Concrete Unit Masonry.

1.02 WARRANTY

- A. Provide two year unconditional guarantee against defects of materials and workmanship which allows water or moisture into areas of the structure which were to be protected by this membrane. Pay for costs of repairing or replacing the defective membrane, as well as costs of exposing and recovering membrane, and consequential damages to persons and property resultant of defective materials or workmanship.

PART 2 - PRODUCTS

2.01 FOUNDATION DRAINAGE SYSTEM: Foundation drainage systems are to be a molded sheet drainage panel system.

- A. Acceptable Manufacturers:
 - 1. Amerdrain 500 by American Wick Drain Crop.
 - 2. Hydroduct by W.R. Grace & Co.
- B. Use a prefabricated, composite drainage system made with drainage core and filter fabric with a minimum flow rate of 15 gpm/foot at 1 hydraulic gradient and 3,600 psf normal pressure.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install systems using waterproofing installers. Roofing trades will not be acceptable to perform this work.
- B. Install systems in strict accordance with manufacturer's specifications. Obtain manufacturer's approval of substrate conditions prior to installing materials.
- C. Provide reinforcing strips, and backer rods necessary for joints and cracks.

END OF SECTION