

**TIERRA DEL SOL MIDDLE SCHOOL
MULTIPURPOSE ROOM MODERNIZATION
LAKESIDE UNION SCHOOL DISTRICT**



SPECIFICATIONS

DECEMBER 18, 2020

Project Tracking No. 68189-52
DSA File No. 37-33, DSA Application No. 04-119723



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

00 00 00

PROCUREMENT AND CONTRACTING REQUIREMENTS

LAKESIDE UNION SCHOOL DISTRICT

**TIERRA DEL SOL MIDDLE SCHOOL
MULTIPURPOSE ROOM MODERNIZATION
LAKESIDE UNION 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

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT

APP: 04-119723 INC:
REVIEWED FOR

SS FLS ACS

DATE: 02/22/2021

STUDIOWC
515 Encinitas Boulevard, Suite 201, Encinitas, CA 92024
(760) 753-6800

<p>ARCHITECT: StudioWC</p> <p align="center"><i>R.D. Webb</i></p> <hr/> <p>Robert D. Webb, Architect, C28036</p>	
<p>STRUCTURAL ENGINEER: Welsh Structures</p> <p align="center"><i>Stephanie Welsh</i></p> <hr/> <p>Stephanie Welsh, Engineer, S2998</p>	
<p>MECHANICAL ENGINEER: PMPE CONSULTANTANS</p> <p align="center"><i>Max Pajouhesh</i></p> <hr/> <p>Max Pajouhesh, Engineer M27488</p>	
<p>ELECTRICAL ENGINEER: Johnson Consulting Engineers</p> <p align="center"><i>Monica Goese Hansen</i></p> <hr/> <p>Monica Goese Hansen, Engineer E14781</p>	

END OF PROJECT TITLE PAGE

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01 00 00

GENERAL REQUIREMENTS

LAKESIDE UNION SCHOOL DISTRICT

SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY

- A. Project: Multipurpose Room Modernization at Tierra Del Sol Middle School, and associated classroom, kitchen, and site work.
- B. Description of Work: Multipurpose Room modernization, minor classroom renovations, kitchen renovations, and addition of two (2) relocatable buildings, plus associated 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 forty-five (45) 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.
- 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

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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

- A. PROVIDE AN ALLOWANCE O \$20,000 FOR OWNER USAGE.

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.

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- B. The Contractor shall:
 - 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 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 ADDITIVE 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

- A. Provide an additive alternate price for the addition of the theater curtains. See plans.
- B. Provide an additive alternate price for the addition of a folding partition wall. See Plans

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 prior to bid, 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.
When colors have been indicated prior to Bid, Contractor shall be required to provide a

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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

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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	_____	
B.	Substantiating Data:	_____	

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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.

Product substitution of _____

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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.

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- 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

Subscribed and sworn to before me this _____ day of _____, 20____.

Notary Public: _____ My Commission Expires:

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:

CONTRACT DATE:

PERIOD TO:

CONTRACT FOR:

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

3.04 THREE WEEK LOOK-AHEAD

- A. A minimum of two days prior to the weekly project meeting, the contractor shall provide the architect with a three-week look-ahead of all construction tasks to be accomplished.

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.

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3. In addition to the above information, laboratory test reports submitted shall show 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 **5 calendar days** after Award of Contract:
 - 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.
 2. Within **10 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.
 3. Within **15 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:	Specification Section:
Project:	Submittal No.:
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.

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- 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

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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

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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)

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IEEE	Institute of Electrical and Electronics Engineers
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

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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.

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- 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.

Failure on the part of the project inspector to notify the contractor of

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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

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 01 11 00 "Summary" for work restrictions and limitations on utility interruptions.
 - 2. Section 01 57 23 "Temporary Storm Water Pollution Control" for storm water requirements during construction.

1.3 USE CHARGES

- A. General: Installation, removal of, maintenance, cleaning, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in project to use temporary services and facilities without cost, including, but not limited to, District, Architect, testing agencies, and authorities having jurisdiction.
 - 1. Water Service: Pay water-service use charges for water used by all entities for construction operations.
 - 2. Electric Power Service: Pay electric-power-service use charges for electricity used by all entities for construction operations.
- B. District's existing water system and electric power are available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations. Allow other entities to use temporary services and facilities without cost, including, but not limited to, District, Architect, testing agencies, and authorities having jurisdiction.

1.4 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel..
- B. Storm Water Pollution Prevention Plan: Provide Storm Water Pollution Prevention Plan per Section 01 57 23 "Temporary Storm Water Pollution Control".
- C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- D. Moisture-Protection Plan as specified herein.
- E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste handling procedures.
 - 5. Other dust-control measures.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Moisture-Protection: Protect materials and construction from water absorption and damage. Protect during delivery, handling, and storage. Discard water-damaged materials, mitigate water intrusion into completed Work, and replace water damaged Work.
- C. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- D. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and CBC.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before District's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 8 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts, with 1-5/8-inch-OD top and bottom rails.
- B. Dust control: Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- C. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.

2.2 TEMPORARY FACILITIES

- A. All field offices and sanitary facilities must comply with applicable codes and regulations, including disabled accessibility regulations.
- B. District Field Offices:
 - 1. Field Office
 - a. The field office, its toilet rooms and its equipment are for the District's exclusive use.
 - b. Provide a 24' x 44' double wide trailer for use by the Project Inspector, District Construction Manager, Controls Personnel and other District personnel.
 - c. Provide meters for all utilities.
 - d. Provide a UFER ground, 5/8" x 8' ground rod connected to the ground buss in the field office electrical panel with a #6 solid CU conductor.
 - e. The trailer shall contain two (2) 10' x 12' and two (2) 10' x 8' private offices with locking doors, one 5' x 5' utility room with sink, and one (1) 20' x 15' conference room.
 - f. The field office shall be installed and completely furnished within two weeks of the Notice to Proceed. This field office must remain on site during the entire Project and cannot be removed without prior written authorization from the District. It shall remain fully operational until Final Completion.
 - g. The trailer layout and location shall be approved by the District Construction Manager.
 - h. This office shall be of substantial waterproof construction, heated, air-conditioned, with adequate natural light and ventilation, tied down, and resting on temporary foundations adequate for normal office loading.
 - i. Provide and mount a 2' x 4' sign containing the proposition logos provided by the District and titled "San Diego Unified School District Construction Office".
 - j. The windows shall be operable, tinted on the exterior, and equipped with window blinds.
 - k. The exterior door shall have access to the outside with landings, stairs, a key-type lock, and a deadbolt key lock.

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- I. Both the window and door glass shall be protected with bars.
 - m. Notify the Project Inspector forty-eight (48) hours prior to the date of hook-up of temporary utilities.
 - n. All facilities described here shall be either in a new or like new condition and shall remain the property of the Contractor. If the facilities are not new, the facilities shall be in a condition acceptable to the District.
 - o. Service, repair and maintain facilities (including, but not limited to, utilities, garbage and cleaning services) in good working order.
2. Toilet Rooms:
 - a. The field office shall have two (2) toilet rooms with toilet accessories as required by applicable law.
 - b. Each toilet room shall have a locking door and be equipped with a water closet with tank (also with toilet tissue dispenser, toilet seat cover dispenser) and a lavatory with hot and cold water service, soap dispenser, and hand-towel dispenser.
 - c. Maintain the toilet rooms in a neat, clean, and orderly manner, and refill all consumables semi-monthly.
3. Equipment:
 - a. Provide six (6) 30" x 60" office desks, five (5) tables satisfactory for the study of plans, two (2) vertical plan racks and (10) sticks, six (6) desk chairs with wheels and arms, and sixteen (24) standard chairs, two (2) 4' x 10' conference tables, two (2) legal size horizontal type lockable 6-drawer and three (3) legal size horizontal type lockable 2-drawer filing cabinets with keys, one (1) large and six (6) small bookshelves, one (1) utility supply cabinet, seven (7) waste paper receptacles, three (3) private telephone lines, two (2) telephone answering devices, adequate electric lights, and bottled drinking water dispenser with paper cups.
 - b. Contractor shall provide seven (7) hands free speaker type telephones distributed as follows: one in each office, one in the conference room and remaining jacks/phones located at the District Construction Manager's direction.
 - c. Service and supply one (1) multifunction color printer/scanner/fax/copier (Canon Advance C33301 with AL-1, G-1 or equal). Multifunction printer shall scan in color. Multifunction printer shall print/copy/scan paper sizes of 8½ x11, 8½ x14 and 11x 17. Provide a service plan and supplies including paper and toner for multifunction printer.
 - d. Provide DSL/cable service to the field office (or high speed wireless if DSL is not available). The field office shall allow for eight (8) District computers and printers. The Ethernet jacks shall be distributed as follows: one (1) in each office, two (2) in the conference room, and one (1) in common area for multifunction printer. Provide DSL/cable connection and necessary hardware for a minimum of six (6) District computers to simultaneously access the Internet and for users to login to District's VPN to utilize District resources. The District's DSL/cable service shall be separate from the Contractor's jobsite network. The DSL/cable service provided by the Contractor shall have the minimum connection speed of a 40 Mbps downstream, 4 Mbps up-stream and have a static IP address for the sole and exclusive use by the District.
 - e. Provide six (6) parking spaces dedicated for District use adjacent to the field office.

- f. All equipment and furnishings described here shall be provided in either a new or like-new condition and shall remain the property of the Contractor. If equipment is not new, the equipment shall be in a condition acceptable to the District.
 - g. Re-supply, service, repair and maintain equipment in good working order, including paper and inks/toner.
1. Field Office:
- a. The field office, its sanitary facilities and its equipment are for the District's exclusive use.
 - b. Provide a 24' x 44' trailer for the use of the Project Inspector, District Construction Manager, Controls Personnel and other District personnel.
 - c. Provide meters for all utilities.
 - d. Provide a UFER ground, 5/8" x 8' ground rod connected to the ground buss in the field office electrical panel with a #6 solid CU conductor.
 - e. The trailer shall contain two (2) 10' x 12' and two (2) 10' x 8' private offices with locking doors, one 5' x 5' utility room with sink, and one (1) 20' x 15" conference room.
 - f. The field office shall be installed and completely furnished within two weeks of the Notice to Proceed. This field office must remain on site during the entire Project and cannot be removed without prior written authorization from the District. It shall remain fully operational until Substantial Completion.
 - g. The trailer layout and location shall be approved by the District Construction Manager.
 - h. This office shall be of substantial waterproof construction, heated, air-conditioned, with adequate natural light and ventilation, tied down, and resting on temporary foundations adequate for normal office loading.
 - i. Provide and mount a 2' x 4' sign containing the proposition logos provided by the District and entitled "San Diego Unified School District Construction Office".
 - j. The windows shall be operable, tinted on the exterior, and equipped with window blinds.
 - k. The exterior door shall have access to the outside with landings, stairs, a key-type lock, and a deadbolt key lock.
 - l. Both the window and door glass shall be protected with security bars.
 - m. Notify the Project Inspector forty-eight (48) hours prior to the date of hook-up of temporary utilities.

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- n. All facilities described here shall be either in a new or like new condition and shall remain the property of the Contractor. If the facilities are not new, the facilities shall be in a condition acceptable to the District.
 - o. Service, repair and maintain facilities (including, but not limited to, utilities, garbage and cleaning services) in good working order.
2. Toilet Rooms:
- a. The field office shall have two (2) toilet rooms with toilet accessories as required by applicable law.
 - b. Each toilet room shall have a locking door and be equipped with a water closet with tank (also with toilet tissue dispenser, toilet seat cover dispenser) and a lavatory with hot and cold water service, soap dispenser, and hand-towel dispenser.
 - c. Maintain the toilet rooms in a neat, clean, and orderly manner, and refill all consumables semi-monthly.
3. Equipment:
- a. Provide six (6) 30" x 60" office desks, five (5) tables satisfactory for the study of plans, two (2) vertical plan racks and (10) sticks, six (6) desk chairs with wheels and arms, and sixteen (16) standard chairs, one (1) 4' x 10' conference table, two (2) legal size horizontal type lockable 6-drawer and three (3) legal size horizontal type lockable 2-drawer filing cabinets with keys, one (1) large and six (6) small bookshelves, one (1) utility supply cabinet, seven (7) waste paper receptacles, three (3) private telephone lines, two (2) telephone answering devices, adequate electric lights, and bottled drinking water dispenser with paper cups.
 - b. Provide seven (7) hands free speaker type telephones distributed as follows: one in each office, one in the conference room and remaining jacks/phones located at the District Construction Manager's direction.
 - c. Service and supply one (1) multifunction color printer/scanner/fax/copier (Canon Advance C33301 with AL-1, G-1 or equal). Multifunction printer shall scan in color. Multifunction printer shall print/copy/scan paper sizes of 8½ x11, 8½ x14 and 11x 17. Provide a service plan and supplies including paper and toner for multifunction printer.
 - d. Provide DSL/cable service to the field office (or high speed wireless if DSL is not available). The field office shall allow for eight (8) District computers and printers. The Ethernet jacks shall be distributed as follows: one (1) in each office, two (2) in the conference room, and one (1) in common area for multifunction printer. Provide DSL/cable connection and necessary hardware for a minimum of six (6) District computers to simultaneously access the Internet and for users to login to District's VPN to utilize District resources. The District's DSL/cable service shall be separate from the Contractor's jobsite network. The DSL/cable service provided by the Contractor shall have the minimum connection speed of a 40 Mbps downstream, 4 Mbps up-stream and have a static IP address for the sole and exclusive use by the District.
 - e. Provide six (6) parking spaces dedicated for District use adjacent to the field office.
 - f. All equipment and furnishings described here shall be provided by the Contractor either in new or like-new condition and shall remain the property of the Contractor. If equipment is not new, the equipment shall be in a condition acceptable to the District.

- g. Re-Supply, service, repair and maintain equipment in good working order, including paper and inks/toner.
1. Field Office:
- a. The field office, its sanitary facilities and its equipment are for the District's exclusive use.
 - b. Provide a minimum 200 sq. ft. trailer for the use of the Project Inspector, District Construction Manager, Controls Personnel and other District personnel.
 - c. Provide meters for all utilities.
 - d. Provide a UFER ground, 5/8" x 8' ground rod connected to the ground buss in the field office electrical panel with a #6 solid CU conductor.
 - e. The field office shall be installed and completely furnished within two weeks of the Notice to Proceed. This field office must remain on site during the entire project and cannot be removed without prior written authorization from the District. It is to be adequately maintained in fully operational condition until Substantial Completion.
 - f. The office is to be located as approved by the Project Inspector.
 - g. This office shall be of substantial waterproof construction, heated, air-conditioned, and with adequate natural light and ventilation on foundations adequate for normal loading.
 - h. The windows shall be operable and tinted on the exterior.
 - i. Both the window and door glass shall be protected with security bars.
 - j. Notify the Project Inspector forty-eight (48) hours prior to the date of hook-up of temporary utilities.
 - k. All facilities described here shall be either in new or like-new condition and shall remain the property of the Contractor. If the facilities are not new, the facilities shall be in a condition acceptable to the District.
 - l. Service, repair and maintain facilities (including, but not limited to, utilities, garbage and cleaning services) in good working order.
2. Toilet Rooms:
- a. The field office shall have two (2) toilet rooms with toilet accessories as required by applicable law.
 - b. Each toilet room shall have a locking door and be equipped with a water closet with tank (also with toilet tissue dispenser, toilet seat cover dispenser) and a lavatory with hot and cold water service, soap dispenser, and hand-towel dispenser.
 - c. Maintain the toilet rooms in a neat, clean, and orderly manner, and refill all consumables semi-monthly.

3. Equipment:
 - a. Provide three (3) 30" x 60" office desks, one (1) table satisfactory for the study of plans, one (1) vertical plan rack and (10) sticks, three (3) desk chairs with wheels and arms, and three (3) standard chairs, three (3) legal size horizontal type lockable 2-drawer filing cabinets with keys, three (3) small bookshelves, one (1) utility supply cabinet, three (3) waste paper receptacles, three (3) private telephone lines, one (1) telephone answering device, adequate electric lights, and bottled drinking water dispenser with paper cups.
 - b. Provide three (3) hands free speaker type telephones.
 - c. Service and supply one (1) multifunction color printer/scanner/fax/copier (Canon Advance C33301 with AL-1, G-1 or equal). Multifunction printer shall scan in color. Multifunction printer shall print/copy/scan paper sizes of 8½ x11, 8½ x14 and 11x 17. Provide a service plan and supplies including paper and toner for multifunction printer.
 - d. Provide DSL/cable service to the field office (or high speed wireless if DSL is not available). The field office shall allow for three (3) District computers and printers. Provide four (4) Ethernet jacks including one for multifunction printer. Provide DSL/cable connection and necessary hardware for a minimum of three (3) District computers to simultaneously access the Internet and for users to login to District's VPN to utilize District resources. The District's DSL/cable service shall be separate from the Contractor's jobsite network. The DSL/cable service provided by the Contractor shall have the minimum connection speed of a 40 Mbps downstream, 4 Mbps upstream and have a static IP address for the sole and exclusive use by the District.
 - e. Provide three (3) parking spaces dedicated for District use adjacent to the field office.
 - f. All equipment and furnishings described here shall be provided by the Contractor in either new or like-new condition and shall remain the property of the Contractor. If equipment is not new, the equipment shall be in a condition acceptable to the District.
 - g. Re-supply, service, repair and maintain equipment in good working order, including paper and inks/toner.

1. Field Offices and Sanitary Facilities: The District does not require field offices or sanitary facilities for this Project.

C. Contractor's Field Office and Sanitary Facilities:

1. The Contractor's Field Office: Equip with lockable entrances, operable windows and serviceable finishes, and heating and ventilation on foundations adequate for normal loading. Provide adequate space for a conference table with sufficient seating for ten (10) people. Provide the sanitary facilities, wash facilities and drinking water as required by applicable codes and regulations.

- D. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations. Store combustible materials away from building(s).

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless District authorizes use of existing permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency and marked for intended location and application.
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Connect to existing service.
 - 1. Arrange with utility company, District, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- C. Water Service: Connect to District's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to District. At Substantial Completion, restore these facilities to condition existing before initial use.

- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas. Isolate work area from occupied areas of building.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
 - 1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- G. Electric Power Service: Connect to District's existing electric power service. Maintain equipment in a condition acceptable to District.
- H. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 - 1. Install electric power service overhead unless otherwise indicated.
- I. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
1. Provide construction for temporary offices, shops, and sheds located within construction area.
 2. Maintain support facilities until Substantial Completion.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations.
1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 31 20 00 "Earth Moving."
 3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
 4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Section 32 12 16 "Asphalt Paving."
- D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- E. Parking: Use designated areas of District's existing parking areas for construction personnel, as designated by project manager.
- F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
- G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
1. Project Identification Sign: Provide Project identification sign as indicated on Drawings.

2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 3. Maintain and touch up signs so they are legible at all times.
- H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with requirements specified in Section 01 74 00 "Construction Waste Management and Disposal."
- I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- J. Existing Elevator Use: Use of District's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to District. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
1. Do not load elevators beyond their rated weight capacity.
 2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
- K. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- L. Existing Stair Usage: Use of District's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to District. At Substantial Completion, restore stairs to condition existing before initial use.
1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.
- 3.4 TREE, PLANT, AND IRRIGATION SYSTEM PROTECTION
- A. Take all measures necessary to protect existing trees, plants and irrigation that is to remain. Measures include, without limitation, substantial barricades to prevent damage. Maintain existing plant materials within the area of Work that are to remain, including periodic watering, trimming, and weeding. Install temporary fencing located to protect vegetation and irrigation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

- B. Inspect the irrigation system with the Project Inspector to determine existing conditions prior to commencement of Work. Repair, replace, or correct damage to existing irrigation system and plant materials caused by Contractor operations without adjustment to the Contract Time or the Contract Price. The repair, replacement, or correction of existing plant materials and irrigation system shall bring both to their original condition prior to construction, as determined by the Project Inspector.
- C. Ensure existing irrigation systems are operable during selective demolition. Provide temporary power to controller. Provide temporary water source to existing mainline within and outside of project limits as required to maintain an operable system during demolition and construction. If temporary power and/or water is unavailable, hand water existing plant materials within and outside of project limits until automatic system is restored.
- D. Provide a qualified arborist who shall certify that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.
- E. Temporary Fencing: Install temporary fencing located as indicated or outside the drip line of trees to protect remaining vegetation from construction damage.
 - 1. Install chain link fence according to ASTM F 567 and manufacturer's written instructions.
- F. Protect tree root systems from damage due to noxious materials caused by runoff or spillage while mixing, placing, or storing construction materials. Protect root systems from flooding, eroding, or excessive wetting caused by dewatering operations.
- G. Do not store construction materials, debris, or excavated material within the drip line of remaining trees. Do not permit vehicles or foot traffic within the drip line; prevent soil compaction over root system.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain prior written permission from the District.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Obtain extended warranty for District.

Perform control operations lawfully, using environmentally safe materials approved by authorities having jurisdiction.

- D. Site Enclosure Fence: Before construction operations begin, provide site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
 - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel.
- E. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- F. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
 - 1. Provide and maintain temporary barricades at all hazardous areas to protect both pedestrians and vehicles at all times. This protection shall be for students, faculty and all others at both offsite and onsite work. Adjust and relocate barricades as necessary for protection as work progresses to different locations. Areas that require barricades include but are not limited to such things as trenches, changes to sidewalks/driveways and projections above ground.
- G. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- H. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by District from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 - 2. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
 - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.

3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 4. Insulate partitions to control noise transmission to occupied areas.
 5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 6. Protect air-handling equipment.
 7. Provide walk-off mats at each entrance through temporary partition.
- I. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
1. Prohibit smoking on District property.
 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.6 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 3. Avoid trapping water in finished work. Indicate methods to be used to avoid trapping water in finished work.
 4. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard, replace, or clean stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use permanent HVAC system to control humidity.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to the District Construction Manager.
 - c. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.7 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary

facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. District reserves right to take possession of Project identification signs.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION 01 50 00

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 01 50 00, Temporary Facilities and Controls
- 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)

PART 3 - EXECUTION

3.01 EXECUTION

- A. Establish the Tree Protection Zone (TPZ), which is defined as a radius of 10 times

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- 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, whichever 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 57 23

TEMPORARY STORM WATER POLLUTION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. CASQA Construction Handbook / Website Portal – Available as a subscription service at: <https://www.casqa.org/resources>.

1.2 SUMMARY

- A. Section includes all the methods and materials to comply with the Project's Water Pollution Control Program (WPCP), which is required for construction sites with a disturbed area of less than one acre or for projects with an Environmental Protection Agency Small Construction Project Erosivity Waiver (Erosivity Waiver):

1.3 ABBREVIATIONS

- A. ATS: Advanced Treatment System.
- B. BMP: Best Management Practice.
- C. CASQA: California Storm water Quality Association.
- D. CCR: California Code of Regulations.
- E. CGP: Construction General Permit.
- F. CSMP: Construction Site Monitoring Program.
- G. C-SWPPP: CONTRACTOR's SWPPP.
- H. C-WPCP: CONTRACTOR's WPCP.
- I. DTSC: Department of Toxic Substance Control.
- J. D-SWPPP: DISTRICT's SWPPP.
- K. D-WPCP: DISTRICT's WPCP.
- L. EPA: Environmental Protection Agency.

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- M. ESA: Environmentally Sensitive Area.
- N. LRP: Legally Responsible Person.
- O. NAL: Numeric Action Level.
- P. NEL: Numeric Effluent Limitation.
- Q. NOI: Notice of Intent.
- R. NOT: Notice of Termination.
- S. NPDES: National Pollutant Discharge Elimination System.
- T. PRD: Project Registration Document.
- U. QSD: Qualified SWPPP Developer.
- V. QSP: Qualified SWPPP Practitioner.
- W. REAP: Rain Event Action Plan.
- X. RWQCB: Regional Water Quality Control Board.
- Y. SAP: Sampling and Analysis Plan.
- Z. SMARTS: Storm water Multiple Application and Report Tracking System.
- AA. SWPPP: Storm Water Pollution Prevention Plan.
- BB. SWRCB: State Water Resources Control Board.
- CC. WDID: Waste Discharge Identification Number.
- DD. WPCD: Water Pollution Control Drawing.
- EE. WPCP: Water Pollution Control Program

1.4 ACTION SUBMITTALS

- A. Refer to entire section for all the submittal requirements.
- B. **C-WPCP:**
 - 1. Preliminary.
 - 2. Final.
 - 3. Amendments.
- C. Construction Site Monitoring Program (CSMP).

D. ATS:

1. ATS Plan.
2. Notice of Discharge Report

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Contractor's **Qualified Person**.
- B. Hazardous waste documentation.
- C. Rain Event Action Plan(s) (REAP).
- D. Storm Water Annual Report.

1.6 LAWS, REGULATIONS, AND POLICIES

- A. A. The following laws, permits, regulations and Board policies apply to the erosion and sediment transport control requirements described in this Section.
 1. Construction General Permit (CGP): National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activity. State Water Resources Control Board (SWRCB) Order No. 2009-0009-DWQ, NPDES No. CAS000002, adopted September 2, 2009 and associated amendments.
 2. California Code of Regulations (CCR), Title 23 (Divisions 2 and 4) and Title 24 (Parts 5 and 11).
 3. California Regional Water Quality Control Board (RWQCB) Water Quality Control Plan for the San Diego Basin (9).
 4. California Statewide General Permit for Waste Discharge Requirements for Discharges from Utility Vaults and Underground Structures to Surface Waters, Order No. 2006-008-DWQ, NPDES No. CAG990002.
 5. California RWQCB San Diego Region, General Waste Discharge Requirements for Discharges of Hydrostatic Test Water and Potable Water to Surface Waters and Storm Drains or Other Conveyance Systems, Order No. R9-2002-0020, NPDES No. CAG679001.
 6. California RWQCB San Diego Region, General Waste Discharge Requirements for Discharges from Groundwater Extraction Waste to Surface Waters within the San Diego Region except for San Diego Bay, Order No. R9-2008-0002, NPDES No. CAG919002 (Waste Discharge Application/NPDES Permit, Form 200, replacing Order No. R9-2001-96).
 7. California RWQCB San Diego Region, General Waste Discharge Requirements for Discharges from Temporary Groundwater Extraction and Similar Waste Discharges to San Diego Bay, Tributaries Thereto under Tidal Influence, and Storm Drains or Other Conveyance Systems Tributary Thereto, Order No. R9-2007-0034, NPDES No. CAG919001.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Best Management Practices (BMP's) shall be installed and maintained for water pollution control following the guidance of the appropriate BMP Fact Sheet from the CASQA Construction Handbook / Website Portal.
- B. BMP's shall be installed and maintained for water pollution control following the guidance of the appropriate BMP Fact Sheet from the CASQA Construction Handbook / Website Portal.
- C. Materials needed for the proper installation and operation of BMP's shall comply with the requirements identified on the appropriate CASQA BMP Fact Sheets.
- D. Materials used in the installation and operation of an ATS shall be in compliance with Attachment F of the CGP.

PART 3 - EXECUTION

3.1 CONSTRUCTION POLLUTION PREVENTION DOCUMENT

- A. Provide a designated individual with evidence of adequate training who shall amend the D-WPCP with phase specific details. A copy of the D-WPCP will be provided by the District. Comply with the same without adjustment of the Contract Price or the Contract Time:
 - 1. Implement the C-WPCP with regards to contract work items and all elements required to protect water quality in compliance with the California RWQCB Water Quality Control Plan for the San Diego Basin, available at:
http://www.swrcb.ca.gov/rwqcb9/water_issues/programs/basin_plan/index.shtml.
 - 2. In addition to compliance with the Water Quality Control Plan, Comply with all other applicable state, municipal or regional laws, ordinances, rules or regulations governing discharge of storm water, including applicable municipal storm water management programs.

3.2 CONTRACTOR'S WATER POLLUTION CONTROL PROGRAM (C-WPCP)

- A. Do not start work until:
 - 1. An approved copy of the C-WPCP is onsite.
 - 2. A copy of the Erosivity Waiver is onsite, if applicable.
- B. Appoint an appropriately trained individual, such as a QSP, to amend and implement the C-WPCP. The appropriately trained individual will hereafter be referred to as the QSP.

- C. Contractor is responsible for protecting stormwater systems and receiving waters from the discharge of potential pollutants from the project site due to construction activities by using stormwater pollution control practices, including the following construction support facilities:
1. Staging areas.
 2. Storage yards for equipment and materials.
 3. Mobile operations.
 4. Batch plants for Portland cement concrete and hot mix asphalt.
 5. Crushing plants for rock and aggregate.
 6. Other facilities installed for construction-related reasons such as haul roads
 7. Borrow and disposal sites:
 - a. Stormwater pollution due to erosion shall be prevented at an operated borrow or disposal site, during and after completion of construction activities.
 - b. Upon completion of work, the site shall be left in a condition where stormwater will not collect or stand therein.
- D. Contractor is responsible for implementing appropriate construction site management and erosion and sediment control best management practices as required to protect water quality. Discharges from the site shall not lead to water quality objective exceedances.
- E. Contractor is responsible for all delays and all costs associated with preparing, submitting and implementing a SWPPP when the Contractor's actions result in one of the following:
1. One or more acres of soil is disturbed on the project without an Erosivity Waiver.
 2. More than five acres of soil is disturbed on the project with an Erosivity Waiver.
 3. Failure to complete the project within the Erosivity Waiver's construction window resulting in a rainfall erosivity value (R value) that no longer qualifies the project for an Erosivity Waiver.

3.3 C-WPCP PREPARATION

- A. Prepare and implement a C-WPCP including the following:
1. Show the location of disturbed soil areas, water bodies, and water conveyances.
 2. Describe the work involved in the installation, maintenance, repair, and removal of temporary and permanent water pollution control practices.
 3. Show the locations and types of water pollution control practices that will be used for:
 - a. Stormwater and non-stormwater in areas outside the job site, but related to project work activities such as:
 - 1) Staging areas.
 - 2) Storage yards.

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- 3) Access roads.
 - b. Activities or mobile operations related to all NPDES permits.
 - c. Construction support facilities.
- B. Show the locations and types of temporary water pollution control practices that will be used in the work for each construction phase.
- C. Show the locations and types of water pollution control practices that will be installed permanently under the Contract.
- D. Include a schedule. The schedule shall show when:
 1. Work activities will be performed that could cause the discharge of pollutants into storm water.
 2. Water pollution control practices associated with each construction phase will be implemented.
 3. Soil stabilization and sediment control practices for disturbed soil areas will be implemented.
- E. Include a copy of permits obtained through the Department such as Fish & Game permits, US Army Corps of Engineers permits, RWCQB 401 certifications, aerially deposited lead variance from the Department of Toxic Substance Control, aerially deposited lead variance notification, and RWCQB waste discharge requirements for aerially deposited lead reuse.
- F. Amend the C-WPCP whenever:
 1. Changes in work activities could affect the discharge of pollutants.
 2. Water pollution control practices are added by change order.
 3. Water pollution control practices are added at your discretion.
 4. Changes in the amount of disturbed soil are substantial.
 5. Objectives for reducing or eliminating pollutants in stormwater discharges have not been achieved.
 6. The project receives a written notice or order from the RWCQB or another regulatory agency.
- G. Start the following process for C-WPCP acceptance within 15 days after Notice to Proceed:
 1. Submit a copy of the C-WPCP. The District will provide comments and specify the date when the review stopped when revisions are required.
 2. Resubmit a revised C-WPCP within seven days of receiving the District's comments. The District's review will resume when the complete revised C-WPCP has been resubmitted.
 3. When the District accepts the revised C-WPCP, submit an electronic copy and a printed copy of the accepted revised C-WPCP.
 4. When the RWCQB is required to review the accepted C-WPCP, submit one copy of the accepted document to the RWCQB for its review and comment.
 5. When the RWCQB orders changes to the C-WPCP, amend the document within three days.

- H. The C-WPCP shall include procedures regarding the following:
1. Monitoring of the National Weather Service forecast on a daily basis. For the National Weather Service forecast, go to: <http://www.srh.noaa.gov/> forecast.
 2. Installation of applicable construction BMPs and practices as required to avoid exceedances of the water quality objectives defined in the San Diego Basin Plan. Refer to the CASQA Construction Handbook for guidance in the installation, maintenance, or selection of additional BMPs (when necessary).
 3. Stormwater pollution control practices shall be installed within 15 days of work activities that disturb soil or before predicted precipitation, as determined necessary for the protection of water quality.
- I. Whenever a deficiency is identified in the implementation of the accepted C-WPCP:
1. Correct the deficiency immediately, unless the District agrees to a later date for making the correction.
 2. Correct the deficiency before precipitation occurs.
 3. The District may correct the deficiency and deduct the cost of correcting the deficiency from payment when the Contractor fails to correct the deficiency by the agreed date or before the onset of precipitation.
 4. Continue C-WPCP implementation during any suspension of work activities.
- J. Whenever there is the concern that the C-WPCP may be inadequate to comply with applicable water quality objectives or water quality standards as contained in the California Toxics Rule, Municipal Permit or San Diego Basin Plan, the QSP may request changes to the stormwater pollution control practices or the District may require changes to stormwater pollution control practices. Changes may include additional or new stormwater pollution control practices. Additional stormwater pollution control work will be paid at unit prices in accordance with Section 01 22 00 "Unit Prices."

3.4 CONSTRUCTION SITE MANAGEMENT

- A. Implement effective erosion and sediment control practices as well as effective handling, storage, usage, and disposal practices thereby controlling potential pollutants on the job site before they come in contact with storm drain systems and receiving waters in accordance with Attachment C, D, or E of the CGP as required by the Project Risk Level.
- B. Guidance for the implementation of BMP's required to control pollution from erosive activities at the job site is located in Section 3 of the CASQA Construction Handbook (Erosion and Sediment Control BMP's).
- C. Guidance for the implementation of BMP's required to control material pollution and manage waste and non-stormwater discharges at the job site is located in Section 4 of the CASQA Construction Handbook (Non-Stormwater Management and Material Management BMP's).

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D. The following Construction Site Management is required for construction materials and potential pollutants:

1. The QSP shall keep an inventory of the materials and equipment onsite that are not designed to be outdoors and exposed to environmental conditions (potential pollutant sources). This potential pollutant list shall be kept with the C-SWPPP and shall identify all non-visible pollutants that are known, or expected, to occur on the construction site.
2. The QSP shall conduct an assessment from the inventory of potential pollutant sources and identify any areas of the site where additional BMP's are necessary to reduce or prevent pollutants in stormwater discharges and authorized non-stormwater discharges. Stormwater discharges and authorized non-stormwater discharges regulated by the CGP shall not contain a hazardous substance equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges. At a minimum, the QSP shall consider the following:
 - a. The quantity, physical characteristics (e.g., liquid, powder, solid), and locations of each potential pollutant source handled, produced, stored, recycled, or disposed of at the site.
 - b. The degree to which pollutants associated with those materials may be exposed to and mobilized by contact with storm water.
 - c. The direct and indirect pathways that pollutants may be exposed to stormwater or authorized non-stormwater discharges, including an assessment of past spills or leaks, non-stormwater discharges, and discharges from adjoining areas.
 - d. Sampling results, visual observations, and inspection records.
 - e. The effectiveness of existing BMP's in reducing or preventing pollutants in stormwater discharges and authorized non-storm water discharges.
 - f. Nothing in the CGP or the D-SWPPP relieves the Contractor from any responsibilities, liabilities, or penalties to which the Contractor is or may be subject to under Section 311 of the Clean Water Act.
3. The QSP shall ensure that the appropriate MSDS forms are available onsite at least five days before hazardous substances are used or stored onsite.

E. The following Good Site Management Housekeeping is required for construction materials:

1. Minimize exposure of potential pollutant sources to precipitation.
2. Cover and berm (contain) stockpiled construction materials that are not actively being used, materials that are adversely affected by wind and rain such as fertilizer, mulches, topsoil, spoils, aggregate, fly-ash, stucco, hydrated lime, etc.
3. Stack erodible landscape material on pallets and cover or store such materials when not being used or applied.
4. Store chemicals in watertight containers (with appropriate secondary containment to prevent any spillage or leakage) or in a storage shed (completely enclosed).
5. Implement BMP's to prevent the offsite tracking of loose construction and landscape materials.

6. Discontinue the application of any erodible landscape material within 2 days before a forecasted rain event or during periods of precipitation.
 7. Apply erodible landscape material at quantities and application rates according to manufacture recommendations or based on written specifications by knowledgeable and experienced field personnel.
- F. The following Good Site Management Housekeeping is required for waste management:
1. Prevent disposal of any rinse or wash waters or materials on impervious or pervious site surfaces or into the storm drain system.
 2. Ensure the containment of portable toilets to prevent discharges of pollutants to the storm drain system or receiving water.
 3. Clean portable toilets on a regular basis inspecting them for leaks and spills. When a problem is identified, corrective action shall be taken in a timely manner (within 72 hours or prior to any likely precipitation event, whichever is more immediate).
 4. Cover waste disposal containers at the end of every business day and during rain events.
 5. Prevent discharges from waste disposal containers to the storm drain system or receiving water.
 6. Contain and securely protect stockpiled waste material from wind and rain at all times unless actively being used.
 7. Implement procedures that effectively address hazardous and non-hazardous spills.
 8. Develop a spill response and implementation plan as part of the C-SWPPP prior to commencement of construction activities.
 9. Ensure the containment of concrete washout areas and other washout areas that may contain additional pollutants so there is no discharge into the underlying soil and onto the surrounding areas.
- G. The following Good Site Management Housekeeping is required for vehicle storage and maintenance:
1. Prevent any of the following substances from discharging to the storm drains or surface waters (not meant to be an all-inclusive list):
 - a. Transfer case oil.
 - b. Antifreeze.
 - c. Brake fluid.
 - d. Power steering fluid.
 - e. Transmission fluid.
 - f. Hydraulic fluid.
 - g. Grease.
 - h. Fuel.
 - i. Oil.
 2. Place all equipment or vehicles, which are to be fueled, maintained and stored in a designated area fitted with appropriate BMP's.

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3. Clean leaks immediately and disposing of leaked materials properly.
- H. The following Good Site Management Housekeeping is required to control air deposition of site materials and from site operations (dust control):
1. Effective wind erosion control BMP's shall be implemented year round to prevent or alleviate dust, which may contain such particulates as sediment, nutrients, trash, metals, bacteria, oil and grease, and organics.
 2. Excavation, transportation, and handling of material containing hazardous waste or contamination shall result in no visible dust migration
- I. Document all Good Site Management Housekeeping BMP's in the C-SWPPP and REAP(s) in accordance with the nature and phase of the construction project (Grading and Land Development Phase, Streets and Utilities, or Vertical Construction for traditional land development projects).
- J. The following Good Site Management Housekeeping is required for non-stormwater management:
1. Effective BMP's shall be implemented to control all non-stormwater discharges during construction.
 2. Vehicles shall be washed in such a manner as to prevent non-stormwater discharges to surface waters or MS4 drainage systems.
 3. Streets shall be cleaned in such a manner as to prevent unauthorized non-stormwater discharges from reaching surface water or MS4 drainage systems.
 4. Dewatering shall be conducted in such a manner as to prevent sediment-laden or contaminated discharge from leaving the site:
 - a. The discharge of water from utility vaults and underground structures and surface waters is covered under the California Statewide permit, Order No. 2006-008-DWQ. Dischargers shall comply with BMPs that ensure the water discharged is not contaminated and will not create an adverse water quality impact when discharged.
 - b. Dewatering BMP's shall be incorporated into the C-SWPPP. The dewatering of construction excavations is subject to San Diego Regional Water Quality Control Board regulations depending on where the accumulated construction water is discharged:
 - 1) Discharge to the sanitary sewer: Discharge of accumulated water to the sanitary sewer is not allowed without the permission of the Department of Public Works. Permission may be obtained by submitting a request to the appropriate Municipalities Public Works Department.
 - 2) Land application of construction site discharges: Land application will comply with Conditional Waiver #2 to the amendments to the Basin Plan Waste Discharge Requirements, as amended in San Diego RWQCB Resolution NO. R9-2007-0104. Contractor shall comply with the Construction site dewatering BMP's specified in Conditional Waiver #2 and will submit a Notice of Intent if requested by the RWQCB.

- 3) Discharge to storm drain or surface waters: When the volume of accumulated groundwater is significant or when the drainage conditions do not allow land application, Contractor shall prepare an NOI to seek permit coverage under San Diego RWQCB Order No. R9-2008-0002, Discharges from Groundwater Extraction and Similar Discharges to Surface Waters and Storm Drains or Order No. R9-2007-0034, Discharges from Groundwater Extraction and Similar Discharges to San Diego Bay. A separate permit is required for Discharges of Hydrostatic Test Water and Potable Water to Surface Waters and Storm Drains, Order No. R9-2002-0020.
 - c. When the Contractor chooses to discharge slurries and drilling mud to land, the Contractor may be required to file an NOI with the RWQCB. Therefore the Contractor shall comply with Conditional Waiver #9, Discharges of Slurries to Land per the amendments to the Basin Plan Waste Discharge Requirements, Resolution No. R9-2007-0104. Choose how and where to discharge slurries and drilling mud.
 - d. Copy of the written approval to discharge into a sanitary sewer system at least five days before starting discharge activities, if applicable. This information shall be on site when discharging to a municipal sanitary sewer system.
 - e. Copy of the written approval from the local health agency, city, county, and sewer district before discharging from a sanitary or septic system directly into a sanitary sewer system, if applicable. This information shall be on site when discharging to a municipal sanitary sewer system.
5. Authorized non-stormwater discharges regulated by the CGP shall not contain a hazardous substance equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges:
- a. Immediately stop working and notify the District if any of the following is discovered onsite:
 - 1) Contractor reasonably believes that the substance discovered is asbestos as defined in Labor Code § 6501.7 or a hazardous substance as defined in Health & Safety Code § 25316 and § 25317.
 - 2) An unidentifiable substance not described in the Contract or the C-SWPPP is discovered.
 - 3) An identifiable substance that has not been made harmless is discovered.
 - b. Handle, store, and dispose of hazardous waste under 22 CA Code of Regulations Division 4.5.
 - c. Dispose of hazardous waste within 90 days of the start of generation. Use a hazardous waste manifest and a transporter registered with the California DTSC to transport hazardous waste to an appropriately permitted Class I Disposal Site.

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- K. The following Good Site Management Housekeeping is required for erosion control:
1. Provide effective soil cover for inactive areas and all finished slopes, open space, utility backfill, and completed lots:
 - a. Provide temporary irrigation equipment for vegetation.
 2. Limit the use of plastic materials when more sustainable, environmentally friendly alternatives exist. Where plastic materials are deemed necessary, consider the use of plastic materials resistant to solar degradation.

- L. The following Good Site Management Housekeeping is required for sediment control:
1. Establish and maintain effective perimeter controls and stabilize all construction entrances and exits to sufficiently control erosion and sediment discharges from the site for all projects regardless of the risk level.
 2. On sites where sediment basins are to be used, design at minimum, sediment basins according to the method provided in CASQA's Construction BMP Guidance Handbook.

- M. Implement appropriate erosion control BMP's (runoff control and soil stabilization) in conjunction with sediment control BMP's for areas under active construction, including:
1. Linear sediment controls along toe to slopes face of the slope, and at the grade breaks of exposed slopes to comply with sheet flow lengths.

Critical Slope/Sheet Flow Length Combinations

Slope Percentage	Sheet flow length not to exceed
0-25%	20 feet
25-50%	15 feet
Over 50%	10 feet

2. Limiting construction activity traffic to and from the project to entrances and exits that employ effective controls to prevent offsite tracking of sediment.
 3. Storm drain protection for all inlets with the potential to receive runoff from areas impacted by construction activities.
 4. Perimeter protection.
 5. Daily inspections of all immediate access roads with removal of any sediment or other deposited materials prior to any rain event by vacuuming or sweeping.
- N. The RWQCB may require implementation of additional site specific sediment control requirements when the installed sediment control BMP's are not adequate to protect receiving waters.

- O. The following Good Site Management Housekeeping is required for run-on and runoff control:
1. All projects shall effectively manage all run-on, all runoff within the site, and all runoff that discharges off the site.
 2. Run-on from offsite shall be directed away from all disturbed areas or shall collectively be in compliance with the effluent limitations in the CGP.
 - 3.

3.5 TEMPORARY BMP INSTALLATION, OPERATION, AND MAINTENANCE

- A. All temporary water pollution control BMP's shall be indicated at a unit price in the Contract Plans and Specifications.
- B. The **C-WPCP** shall describe and include the specific use of each type of water pollution control BMP as required for adherence to water quality objectives.
- C. When a temporary construction entrance or roadway is being used, do not allow soil, sediment, or other debris that is tracked onto the pavement to enter storm drains, open drainage facilities, and watercourses.
- D. When material is tracked onto the pavement, remove it within 24 hours unless the District authorizes a longer period.
- E. Retain records of street sweeping activities including sweeping times, sweeping locations, and the quantity of disposed sweeping waste as part of the C-SWPPP.
- F. Before installing erosion control measures remove and dispose of trash, debris and weeds in areas to receive erosion control materials.
- G. Protect any hardscape, lined drainage channels, and existing vegetation from hydraulically applied material overspray.
- H. Proper selection of materials is critical for specific slopes and slope distances. No one product is applicable for all situations. Erosion control products should be selected on a case by case basis.
- I. Do not drive vehicles upon erosion control products following placement.
- J. Install temporary fencing for the protection of ESA's and the preservation of existing vegetation:
 - 1. If wood posts are used, fasteners shall be staples or nails.
 - 2. If steel posts are used, fasteners shall be tie wires or locking plastic fasteners.
 - 3. Spacing of the fasteners shall be no more than 8 inches apart.
 - 4. Before clearing and grubbing activities.
 - 5. From outside of the protected area.
 - 6. With posts spaced 8 feet apart and embedded at least 16 inches in the soil.
 - 7. Signs shall be attached with the top of the sign panel flush with the top of the high visibility fabric and placed 100 feet apart along the length and at each end of the fence.
 - 8. Install fence to enclose the drip line of foliage canopy of protected plants and protect visible roots from encroachment.
- K. Provide a certificate of compliance (certified weed free from the vendor) for temporary straw bales when used as visibility or noise barriers in ESA's.
- L. Place gravel-filled bags behind Type K temporary railings if used in an area with run-on.

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3.6 POST-CONSTRUCTION BMP's

- A. Install post-construction BMP's as required by the Contract Documents and described in the C-SWPPP to minimize or mitigate for post-construction activities that may be potential sources of stormwater pollution.
- B. Provide maintenance for any post-construction BMP's that have been adversely affected by construction activities:
 - 1. Maintain post-construction BMPs for of **90 days**.
 - 2. Maintenance activities will vary depending upon the BMPs in place and the construction activities.
 - 3. The District will not pay for maintenance of post-construction BMP's unless arrangements are made prior to project initiation.
 - 4. Manufacturer's specifications, civil drawings, and maintenance and operation manuals/plans for each post-construction BMP shall be included in the Record Documents submittal to the District.
- C. The Contractor is responsible for ensuring that all post-construction BMP's are in proper working order with no maintenance required prior to the next rain event.

3.7 MAINTENANCE PRIOR TO FINAL ACCEPTANCE

- A. Maintain planted areas in a satisfactory condition until final acceptance of the project. Such maintenance shall include the filling, leveling, and repairing of any washed or eroded areas, as may be necessary and sufficient watering to maintain the plant materials in a healthy condition.
- B. The District may require replanting of any areas in which the establishment of the vegetative ground cover does not appear to be developing satisfactorily.

END OF SECTION 01 57 23

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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.
 - 2. Limitations of storage space.

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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
- Roofing

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.

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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.
 - 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 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 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 awarding 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.

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2. Circuit directories of panelboards:
 - 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 recording device and personnel to record the session. Submit recordings on a thumb drive.
- 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

02 00 00

SITE WORK

LAKESIDE UNION 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

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 salvable 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 salvage plan and approved by Owner.

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

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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

LAKESIDE UNION 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) 2019, 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 1-09 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. Screed 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.

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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.

- 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. Concrete Forming and Accessories; refer to Section 03 10 00.
 - 3. Cast-in-Place Concrete; refer to Section 03 30 00.
 - 4. Concrete Unit Masonry; refer to Section 04 22 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) 2019, and CRSI, 2018, 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 318-14 - 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, 29th Edition, 2018 - Manual of Standard Practice

AWS A5.1: 2012 - Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding

AWS A5.5: 2014 - Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding

AWS D1.4: 2018 - Structural Welding Code---Reinforcing Steel

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- B. In addition to CRSI specifications, follow ACI 315 and 318, AWS welding codes and qualifications, and ASTM A185, A615 and A706.
- C. Testing of bars in accordance with Title 24, Section 1910A.2, Part 2.

1.04 TESTING

- A. Comply with Title 24, Section 1910A.2
- 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.

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- 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 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 26.5.3.2 (a), ACI 318.

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.
 - 5. Miscellaneous steel, see Section 05 12 00 Structural Steel Framing.

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 1705A.3 and 1905A 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 1905A1.15
 - 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 backcharged 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.

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- 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 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, 2019, 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 3051-14.
- 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 2019 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 1910A.1, Title 24, Part 2, and Section 26.4.1.1, ACI 318.

- C. Core Tests: Take and test composite construction cores in accordance with Section 1910A.4, Title 24, Part 2

- D. Batch Plant Inspection: Provide in accordance with Section 1705A.3.3, 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 1905A.1.15, 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.

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- 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.5, Title 24, Part 2. If aggregates contain reactive substances, reactive with cement alkalies they may not be used.
- 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 2019, Title 24, Part 2, 1903A.5 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.

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- 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 26.4.1.3, 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 2019.
- 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. Pozzoloth 300 R.

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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 Section 26.4.1.4 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.
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 Embecco 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

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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 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, 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 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 305 1-14 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.

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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, 2019, 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 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 26.5.3, 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.
 - 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 Dustproofers: 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 26.5.3, 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.

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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.
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 or 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

04 00 00

MASONRY

LAKESIDE UNION SCHOOL DISTRICT

SECTION 04 22 00

CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Completion of concrete masonry work as indicated on the Drawings and specified herein.
- B. Related Sections:
 - 1. Concrete Reinforcing; refer to Section 03 20 00.
 - 2. Hollow Metal Doors and Frames; refer to Section 08 11 13.
 - 3. Lath and plaster, see Section 09 24 00 – Cement Plastering.

1.02 REFERENCE STANDARDS

- A. Perform work with materials complying with ASTM C90 specifications.
- B. Conform to the requirements of Section 01 45 23 - Testing and Inspection Services.
- C. Masonry work shall be continuously inspected by an inspector specially approved by Division of the State Architect (DSA), per California Building Code (CBC) Title 24, Part 2, Section 1705A.4
- D. Reinforcing bar welding inspection shall comply with Title 24, Part 2, Section 1705A.3.1.

1.03 SUBMITTALS

- A. Shop Drawings for reinforcing, bending and placement of unit masonry reinforcing bars. Comply with ACI 315 "Details and Detailing of Concrete Reinforcement" (located in SP-66: ACI Detailing Manual) showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of masonry reinforcement, including reinforcement positioning devices.
- B. Full-size units for each different exposed masonry unit required showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.

1.04 QUALITY CONTROL

- A. Masonry testing shall be in accordance with Title 24, Part 2, Section 2105A.
- B. Masonry core tests shall comply with Title 24, Part 2, Section 2105A.4.
- C. Raw Materials location certificate.
- D. Manufacturing location certificate.

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E. Sample Panel:

1. Construct a sample panel to determine the compatibility of materials and the effect of the materials and construction procedures on the final appearance of the wall. Use jobsite materials, including specified water-repellent CMU and mortar to construct sample panel. The CMU sample panels erected shall represent the range of texture and color permitted for the project. Prepare more than one sample batch of mortar, especially when coloring pigments are added to the mortar, to establish desired aesthetics and performance. Perform all construction procedures on sample panel, including cleaning and application of coatings and sealants. Retain sample panel during construction as standard for judging completed masonry work. Acceptance of sample panel does not constitute approval of deviations from materials contained in sample panel, unless such deviations are specifically approved by Architect in writing.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All raw materials shall originate no more than 500 miles from project site. Brick sources shall be from locations no greater than 500 miles from project site.
 1. Materials shall conform to CBC 2019, Title 24, Part 2, and other requirements hereinafter.

2.02 CONCRETE UNIT MASONRY

- A. Provide smooth face, light weight or medium weight concrete masonry units as specified on the Structural Drawings and in compliance with ASTM C90, Grade N, Type I, modular. Provide complimentary shapes such as corner and end units, bases, bond beams, lintels, corbels, etc. Provide units open one or both ends. Maximum linear shrinkage shall be .06% from standard oven dry condition. Concrete masonry units shall have a minimum f_m of 2000 p.s.i. Conform to section 2105A.2, Title 24, Part 2.

2.03 COMPONENTS

- A. Reinforcing steel bars shall comply with ASTM A615, Grade 60, except that Number 3 and smaller bars shall be Grade 40, in compliance with Chapter 19A, Title 24, Part 2.
- B. Expansion Joint Fillers: Extruded PVC conforming to ASTM D2287 with a Durometer hardness of 80 maximum.
- C. Reinforcement positioning devices.
- D. Water Repellents, Preferred Product: Surpro HDWB, by Surtec, Inc. or approved equals. (Minimum 5 Year Warranty).
 1. Rainguard International Products – Micro Seal
 2. Monopole Inc. - Aquaseal

2.04 MIXES

A. Mortar and Grout:

1. Cement: ASTM C150, Type I or Type II, comply with Sections 2103A.9 and 2103A.13, Title 24, Part 2, CBC, for mortar and grout, respectively. Temperature of cement delivered to the plant shall not exceed 150 degrees F.
2. Aggregates: ASTM C144, complying with 2019 CBC, Title 24, Part 2, 2103A.3.
3. Lime: ASTM C207.
4. Water: Clean and free from deleterious substances.
5. Sand: Comply with the "Standard Specifications for Aggregate for Masonry Mortar", ASTM Designation C-144, except provide natural sand graded from coarse to fine within the following limits:

Passing No. 4 sieve	100%
Passing No. 8 sieve	95% to 100%
Passing No. 16 sieve	70% to 100%
Passing No. 30 sieve	40% to 75%
Passing No. 50 sieve	10% to 35%
Passing No. 100 sieve	3% to 15%
6. Pea Gravel: Graded with 100% passing the 3/8-inch sieve and not more than 5% passing the No. 8 sieve.

B. Mortar and Grout for High-Lift:

1. Workmanship shall conform to Title 24, Part 2, Section 2104A.1.3.1.2.3 and DSA IR 21-2.
2. Pea Gravel: Pea gravel for grout shall conform to ASTM C404 Table I, Coarse Aggregate, except when other gradings are specifically approved by the Architect or Structural Engineer, and the Division of the State Architect.
3. Coarse Aggregate: Coarse aggregate, when permitted in grout fill, shall conform to Title 24, Part 2, Section 2103A.3.
4. Admixture: The grout shall contain an admixture of the type that reduces early water loss to the masonry units and produces an expansive action in the plastic grout sufficient to offset initial shrinkage and promote bonding of the grout to interior surfaces of the masonry units. The admixture shall have the approval of the Architect or Structural Engineer, and the Division of the State Architect. See IR 21-2 for types of admixtures.

2.05 SOURCE QUALITY CONTROL

- A. Package Materials to be delivered and stored in original packages until ready for use. Store cement, lime and aggregates in a manner which prevents deterioration or contamination.
- B. Do not use material which is caked, lumpy, partially set or otherwise deteriorated.
- C. Mortar and Grout: The quality and testing of mortar and grout shall comply with the

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requirements of Section 2105A, Title 24, Part 2.

1. Mortar: Materials for mortar shall be mixed in the following order:
 - a. For mortar strength of 2000 psi @ 28 days.
 - b. Place approximately half the required water and sand into the mixer while running.
 - c. Add cement and the remainder of the sand and water into the mixer in that order and mix for a period of at least two (2) minutes.
 - d. Add lime and continue mixing as long as needed to secure a uniform mass. In no case shall the total mixing time be less than ten (10) minutes.
2. Grout: Grout shall develop a minimum compressive strength of 2000 pounds per square inch at 28 days when tested in accordance with Title 24, Part 2, Section 2105A.2.
3. The coarse grout mix shall consist of one part Portland Cement to 2-1/4 to three times the sum of the volumes of the cementitious materials of sand and not less than 1.5 nor more than 1.8 times the sum of the volume of the cementitious materials of pea gravel based on a dry loose volume.
4. Sufficient water shall be added to make a workable mix that will flow into joints of the masonry without separation or segregation. When grout is to be placed in masonry units with typical rates of absorption the slump of the grout should be approximately 9 to 10 inches depending on temperature and humidity conditions.
5. Where the least lateral dimension of cells to be filled exceeds five inches grout fill using a coarser aggregate may be used if the mix is designed in accordance with Specifications Section 03 30 00 Part 3.03. The maximum size of aggregate shall not exceed 1 inch.
6. The water per sack of cement may be greater than is shown in Title 24, to allow for absorption by the masonry units and shall be sufficient to meet the workability requirements given in the paragraph above.
7. Grout mixes may contain an approved admixture conforming to the requirements of IR 21-2, and Title 24, Part 2, Section 2103A.3 when approved by the Division of the State Architect. The admixture shall be used in accordance with manufacturer's instructions.
8. The mixing of grout shall conform to the requirements for mixing of concrete, Title 24, Part 2, Sections 2103A.3 and 2104A and ACI 318, Section 26.4. Grout shall be mixed and delivered in accordance with the requirements for transit-mixed concrete.
 - a. The addition of the admixture shall be timed in strict accordance with the manufacturer's instructions and the procedure used for adding it to the grout mix shall provide good dispersion.

9. Certification: The quality and quantities of material used in transit-mixed grout shall be continuously checked by a Batch Plant Inspector at the location where the materials are measured.
10. Certification concerning quality of materials may be accepted from a licensed Weighmaster in lieu of continuous plant inspection, for low-lift construction, if the following procedures are used to check the quality of the materials to be used in the grout.
 - a. Test samples of the aggregate to be used in the grout shall be taken and tested in a laboratory in accordance with ASTM C404.
 - b. The transit-mix grout supplier shall use a mix design for the proportions of cement, sand and pea gravel or coarser aggregate prepared by the Owner's Testing Laboratory.
 - c. On the first half-day transit-mixed grout is supplied to the job, and at such other times as may be required by the Architect and/or Structural Engineer, the quantity and quality of materials used in the transit-mixed grout shall be continuously checked by an approved inspector at the batch plant location.

In addition to the quality of the aggregates, the Inspector shall verify the quality of the cement.
 - d. The licensed weighmaster shall certify to each load on a load ticket transmitted to the Owner's Inspector and shall furnish a verified affidavit at the completion of the project, in accordance with Title 24, Part 2, Section 1705A.3.3.2.
11. Tests: Testing of mortar and grout shall conform to the requirements of Title 24, Part 2, Section 2105A.3.
 - a. Core tests of the masonry shall be in accordance with Section 2105A.4, Part 2, Title 24.

2.06 INTEGRAL WATER-REPELLENT ADMIXTURE

- A. Description: Integral liquid polymeric admixture for mortar added during mixing.
- B. Water Permeance of Masonry: Capable of achieving a Class E Rating when evaluated using ASTM E514 with the test extended to 72 hours, using the rating criteria specified in ASTM E514.
 1. Provide one of the following, or other approved:

BASF, Rheopel® Plus
ACM Chemistries, RainBloc®
W.R. Grace & Co., Dry-Block® System

PART 3 - EXECUTION

3.01 PREPARATION

- A. Mortar: Minimum compressive strength 2000 p.s.i. at 28 days and 1500 p.s.i. at 7 days. Mix per Title 24, Part 2, Section 2103A.2.
 - 1. Mortar shall consist of 1 part Portland cement, 2-1/4 to 3 times the sum of the separate volumes of the cementitious materials sand based on dry loose volume, and not less than 1/4 part nor more than 1/2 times the sum of the separate volumes of the cementitious materials lime. Lime shall be the last material added to mixer. Materials for mortar and grout shall be measured in suitable calibrated devices. Shovel measurements will not be accepted. Aggregates for mortar shall conform to the provisions set forth in ASTM C144.
 - 2. Admixtures shall not be added to the mortar unless approved by the building official.
 - 3. Installer shall use only concrete masonry units containing compatible integral water repellent CMU admixture for exterior wall construction.
 - 4. Installer shall use only mortar containing integral water-repellent mortar admixture at the manufacturer's recommended addition rate and mixed according to the manufacturer's recommended instructions.
- B. Grout: Minimum compressive strength 2000p.s.i. at 28 days and 1200 p.s.i. at 7 days, just add sufficient water to allow a workable mix that will flow under its own weight. Grout mix per Section 2103A.3.
 - 1. General: Grout shall be proportioned by volume and shall have sufficient water added to produce consistency for pouring without segregation. Aggregate shall conform to the requirements set forth in ASTM C404.
 - 2. Type: As referenced in 2.05, paragraph C.3, this section.
 - 3. Strength: Grout shall attain a minimum compressive strength of 2000 pounds per square inch at 28 days for $f'_m = 2000$ pounds per square inch.
 - 4. Aluminum Equipment: Grout shall not be handled nor pumped utilizing aluminum equipment unless it can be demonstrated with the materials and equipment to be used that there will be no deleterious effect on the strength of the grout.
 - 5. Color mortar to match block for exposed masonry walls: Verify color with Architect. Color admixture must be water soluble and inert, Davis True Tone Cement color, or other approved.
- C. Colors shall meet the contract documents.

3.02 APPLICATION

- A. Laying Block: Lay block in running bond for smooth face, and split-face, and ribbed split-face units. Mortar for bed joints flattened, furrowing of bed joint mortar will not be permitted. Head joints solidly filled with mortar for a distance in from the face of the wall or unit not less than the thickness of the longitudinal face shell. Shove blocks into place to compact the head joint mortar and improve the bed joint. Vertical cells shall have vertical alignment sufficient to maintain a clear, unobstructed continuous vertical cell measuring not less than 2 x 3 inches for low lift grouting, and 3 x 3 inches for high lift grouting. Remove overhanging mortar and debris from cells before grouting. Install hollow metal frames as indicated on Drawings.
- B. Reinforcing Steel: Accurately placed as shown on the drawings, positively secured and supported in such a manner that no movement occurs when the grout is poured. Reinforcing and tie wires shall be embedded in the grout. The thickness of the grout between masonry units and reinforcing shall be a minimum of one bar diameter.
 - 1. Horizontal reinforcement shall be placed in bond beam units. The openings through webs for horizontal reinforcement shall be a minimum of 3" x 3".
- C. Chipped or cracked blocks will not be permitted in the work: Replace defective blocks and blocks cut when cylinder is removed with new masonry which matches the existing in respects.

3.03 GROUTED MASONRY

- A. Comply with 2019 CBC, Title 24, Part 2, Section 2104A.1.3.1.2 as follows:

General Conditions. Grouted masonry shall be constructed in such a manner that all elements of the masonry act together as a structural element.

- 1. Prior to grouting, the grout space shall be clean so that all spaces to be filled with grout do not contain mortar projections greater than 1/4 inch (6.4 mm), mortar droppings and other foreign material. Grout shall be placed so that all spaces to be grouted do not contain voids.
- 2. Grout materials and water content shall be controlled to provide adequate fluidity for placement without segregation of the constituents, and shall be mixed thoroughly. Reinforcement shall be clean, properly positioned and solidly embedded in the grout.
- 3. The grouting of any section of wall shall be completed in one day with no interruptions greater than one hour.
- 4. Between grout pours, a horizontal construction joint shall be formed by stopping all wythes at the same elevation and with the grout stopping a minimum of 1-1/2 inches (38 mm) below a mortar joint, except at the top of the wall. Where bond beams occur, the grout pour shall be stopped a minimum of 1/2- inch (12.7 mm) below the top of the masonry.

3.04 REINFORCED HOLLOW UNIT MASONRY

- A. Comply with 2019 CBC, Title 24, Part 2, Section 2104A.1.3.1.2, as follows:

Reinforced Hollow-Unit Masonry is that type of construction made with hollow masonry units in which cells are continuously filled with grout, and in which reinforcement is embedded. All cells shall be solidly filled with grout in reinforced hollow-unit masonry, except as provided in Section 2104A.1.3.1.2. Construction shall be one of the two following methods: The low-lift method where the maximum height of construction laid before grouting is 4 feet (1220 mm), or the high-lift method where the full height of construction between horizontal cold joints is grouted in one operation. General requirements for construction shall be as follows:

1. All reinforced hollow-unit masonry shall be built to preserve the unobstructed vertical continuity of the cells to be filled. All head joints shall be solidly filled with mortar for a distance in from the face of the wall or unit not less than the thickness of the longitudinal face shells.
2. Mortar shall be as specified in Title 24, Part 2, Section 2103A.2.
3. Walls and cross webs forming such cells to be filled shall be full bedded in mortar to prevent leakage of grout.
4. Bond shall be provided by lapping units in successive vertical courses. Where stack bond is used in reinforced hollow-unit masonry, the open-end type of unit shall be used with vertical reinforcement spaced a maximum of 16 inches (406 mm) on center.
5. Vertical cells to be filled shall have vertical alignment sufficient to maintain a clear unobstructed, continuous vertical cell measuring not less than 2 inches by 3 inches (51 mm by 76 mm), except the minimum cell dimension for high-lift grout shall be 3 inches (76 mm).
6. At the time of laying, all masonry units shall be free of dust and dirt.
7. Grout shall be a workable mix suitable for placing without segregation and shall be thoroughly mixed. Grout shall be placed by pumping or an approved alternate method and shall be placed before initial set or hardening occurs. Grout shall be consolidated by mechanical vibration during placing and reconsolidated after excess moisture has been absorbed, but before workability is lost. The grouting of any section of a wall shall be completed in one day, with no interruptions greater than one hour.
8. All reinforcing and wire ties shall be embedded in the grout. The space between masonry unit surfaces and reinforcing shall be a minimum of one bar diameter.
9. Horizontal reinforcement shall be placed in bond beam units with a minimum grout cover of 1 inch (25 mm) above steel for each grout pour. The depth of the bond beam channel below the top of the unit shall be a minimum of 1-1/2 inches (38 mm) and the width shall be 3 inches (76 mm) minimum.

3.05 LOW-LIFT GROUTED CONSTRUCTION

- A. Comply with 2019 CBC, Title 24, Part 2, Section 2104A.1.3.1.1.1.1, as follows:

Low-Lift Grouted Construction. Units shall be laid a maximum of 4 feet (1220 mm) before grouting, and all over-hanging mortar and mortar droppings shall be removed. Grouting shall follow each 4 feet (1220 mm) of construction laid and shall be consolidated so as to completely fill all voids and embed all reinforcing steel. When grouting is stopped for 1 hour or longer, horizontal construction joints shall be formed by stopping the pour of grout not less than 1/2 inch (13 mm) or more than 2 inches (51 mm) below the top of the uppermost unit grouted. Horizontal steel shall be fully embedded in grout in an uninterrupted pour.

3.06 HIGH-LIFT GROUTED CONSTRUCTION

- A. Comply with 2019 CBC, Title 24, Part 2, Section 2104A.1.3.1.1.1.2, and IR 21-2 as follows:

High-Lift Grouted Construction. Where high-lift grouting is used, the method shall be approved by the enforcement agency. Cleanout openings shall be provided in every cell at the bottom of each pour of grout. Alternatively, if the course at the bottom of the pour is constructed entirely of inverted open-end bond beam units, cleanout openings need only be provided in every reinforced cell at the bottom of each pour of grout. The foundation or other horizontal construction joints shall be cleaned of all loose material and mortar droppings before each pour. The cleanouts shall be sealed before grouting. An approved admixture that reduces early water loss and produces an expansive action shall be used in the grout.

Vertical barriers of masonry may be built across the grout space. The grouting of any section of wall between barriers shall be completed in one day with no interruption longer than one hour.

3.07 STRESSES

- A. Comply with 2019 CBC, Title 24, Part 2, Section 2107A as follows:

Stresses. All reinforced hollow-unit masonry shall be so constructed that the units stressed do not exceed those set forth in Title 24, Part 2, Sections 2107A and ACI 530 Section 2.3.

Vertical barriers of masonry may be built across the grout space. The grouting of any section of wall between barriers shall be completed in one day with no interruption longer than one hour.

Note: See Section 2105A.2 for assumed masonry strength.

3.08 CONSTRUCTION REQUIREMENTS

- A. Comply with 2019 CBC, Title 24, Part 2, Section 2104A.1.3.1 as follows:

Construction Requirements. Reinforcement and embedded items shall be placed and securely anchored against moving prior to grouting. Bolts shall be accurately set with templates or by approved equivalent means and held in place to prevent dislocation during grouting.

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Segregation of the grout materials and damage to the masonry shall be avoided during the grouting process.

Grout shall be consolidated by mechanical vibration during placement before loss of plasticity in a manner to fill the grout space. Grout pours greater than 12 inches (300 mm) in height shall be reconsolidated by mechanical vibration to minimize voids due to water loss. Grout not mechanically vibrated shall be puddled.

3.09 ALUMINUM EQUIPMENT

- A. Comply with 2019 CBC, Title 24, Part 2, Section 2104A.1.3.1 as follows:

Aluminum Equipment. Grout shall not be handled nor pumped utilizing aluminum equipment unless it can be demonstrated with the materials and equipment to be used that there will be no deleterious effect on the strength of the grout.

3.10 CLEANING

- A. Immediately after the wall has been fully grouted, the scum and stains which have percolated through the blocks and joints shall be cleaned, but shall NOT be hosed off with water under pressure through a jet nozzle.
- B. Keep area clean and neat. After completion of grouting, clean up and remove resultant debris from the site.

3.11 CURING

- A. Top of grout pour should be kept damp to prevent too rapid drying during hot or drying weather and drying winds.
- B. Damp cure masonry work for a period of not less than seven days after the work is completed. Make provisions for curing on Saturdays, Sundays and Holidays.

END OF SECTION

05 00 00

METALS

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SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Furnish and Installation of structural framing members, complete in place with required bracing, weld washers, nuts, shims, anchor bolts, and baseplates as indicated on the Drawings and specified herein.
- B. Related Sections: Metal Fabrications; refer to Section 05 50 00.

1.02 REFERENCE STANDARDS

- A. Refer to the following for information regarding materials and installation methods necessary:
 - 1. California Building Code (CBC) 2019, Chapters 22A and 35, as adopted by Title 24, and Chapter 7, Section 704 Fire-Resistance Ratings of Structural Members.
 - a. Refer to Drawings for details, design numbers, and ratings.
 - 2. On-Site Welding Requirements, Sections 2204A, 1704A and 1705A, Title 24, Part 2, California Building Code, 2019.
 - 3. American Society for Testing and Materials: Specifications A36, A123, A307, A370, A501, A572 and A992.
 - 4. American Institute of Steel Construction (AISC).
 - 5. American Welding Society: AWS D1.1 and AWS D1.4
 - 6. Steel Structures Painting Council (SSPC).

1.03 SUBMITTALS

- A. Submit Shop and Erection Drawings Prior to Fabrication: Prepare erection drawings by State registered Structural Engineer. Show welded connections, lengths of welds, profiles, sizes, spacing and locations of members, attachments, anchorages, framed openings, size and type of fasteners, cambers and live loads. Contractor shall be responsible for reviewing and verifying all dimensions on shop Drawings.
 - 1. Splices and Deviations: Splices will be permitted only where and as shown on Drawings. Deviations from design drawings desired or required by fabricator are to be indicated on shop drawings by providing a heavy line around the feature on which deviation approval is being requested, showing complete detail and describing deviation proposed. Provide detail with a note specifically requesting approval of deviation by fabricator. Deviations or changes shall not be made without the approval of the Division of the State Architect, as a Change Order.
 - a. Refer to Section 01 33 00 – Submittal Procedures, Paragraph 3.04A.2. (Revisions) Cost of such changes shall be borne by the Contractor.

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- B. Erection and Bracing Plan and Procedure: Refer to Section 2205A, Title 24, Part 2, California Building Code. Employ a California State licensed Structural Engineer to prepare erection and bracing plan and erection procedure for structural steel including columns, beams, and girders, who will be responsible for compliance. Follow plan and procedure exactly. Maintain a copy at project site. Pay for costs involved.
- C. Scrap collection and recycling plan: Contractor shall prepare and submit a scrap collection and recycling plan for all miscellaneous and structural steel.

1.04 QUALITY ASSURANCE

- A. Tests and Inspections: Testing for steel shall be done in accordance with Title 24, Part 2, Section 1705A.2. Inspection shall be in accordance with Title 24, Part 2, Section Table 1705A.2.1.
- B. If structural steel can be identified by heat or melt numbers and is accompanied by mill analysis and test reports (identified stock shall not be tested), testing shall be in accordance with Title 24, Part 2, Section 2203A.1
- C. If structural steel cannot be identified or its source is questionable, make not less than one tension and one bend test for each 5 tons or fraction thereof. Also, it shall be tested to meet minimum chemical and mechanical requirements of the ASTM standard appropriate for the steel specified for the structure.
- D. Furnish test specimens from steel fabricator and take them under the direction of the Testing Agency. Machine each test specimen by Testing Agency to dimensions required by ASTM A370.
- E. Have testing agency pick up test specimens and make required tests.
- F. Costs of tests of identified stock will be paid for by Owner, unless tests fail to comply with the specifications, in which case the Owner will pay for testing, but back charge the Contractor. Costs of tests for unidentified stock will be paid for by the contractor.
- G. Complete a 4-sided inspection of steel. Such inspection shall be paid for by the Owner. The Inspector of structural steel which is not fabricated within 25 miles of the project site, shall also be paid for by the Owner, but the Contractor shall pay for travel expenses.
- H. After fabrication and inspection, costs associated with re-inspection of defective or replaced materials shall be paid for by the Owner, but backcharged to the Contractor.
- I. Provide labor, equipment and facilities necessary for moving and handling materials to be inspected.
- J. Provide and pay for supervision by a registered Inspector of welding operations of frames with joints, including inspection for quality, penetration, and conformity of Drawings, and a report verifying that welding is adequate and was done in conformity of project requirements.
 - 1. Visually inspect welds, and have inspector present to approve welding and high strength bolting whether performed in fabricator's shop or at project site, and inspect erection. Ensure testing laboratory compliance with regulations of the Division of the State Architect and certify in writing, upon completion of work, that welding and high strength bolting has been performed in accordance with Drawings and these Specifications. Inspect grouting of column base plates.

2. Have testing laboratory check bolt tightness on not less than 10 percent of bolts selected at random in each high strength bolt connection. Follow procedures of ASTM A325 and A490.
 3. Inspect all complete penetration welds and partial penetration welds by ultrasonic or other approved nondestructive tests. Inspect first pass of multi-pass welds and groove welds.
 4. Perform ultrasonic testing by specially trained, qualified technicians who operate equipment, examine welds and maintain a record of welds examined, defects found and disposition of each defect. Repair defective welds and retest.
 5. Ultrasonically test welds at rate of 100 percent to establish welder qualifications. If rejectable defect rate is less than 5 percent, frequency may be reduced to 25 percent. If rate increases above 5 percent, continue 100 percent testing until rejectable defect rate again drops below 5 percent. Calculate percentages by individual welder.
 6. Submit all preliminary, working and final documents required by subsection 1.04K.
 7. Inspect all seam welds at HSS steel member.
- K. Comply with California Building Code (CBC) Title 24, Part 2, Sections 2213A and 1705A.2.
- L. Results of tests, together with identified copies of the Mill Analysis and inspection reports shall be submitted to the Division of the State Architect, and to the Architect and Structural Engineer. Arrange for continuous inspection of Shop and field welding in accordance with Title 24, Part 2 Section 1705A.2.2.1 and Table 1705A.2.

1.05 PROJECT CONDITIONS

- A. Verify measurements, lines, grades, locations and details at project site. Conform to existing field conditions.

PART 2 - PRODUCTS

2.01 MATERIALS AND COMPONENTS

- A. Structural Steel Members: Shall conform to the requirements of ASTM A6, add the following sentence "and shall be fabricated according to AISC Practice and Specifications for Building."
- B. Structural plates, bars, etc., shall conform to ASTM A36 and ASTM A572. Structural wide flange beams and columns shall conform to ASTM A992, Grade 50.
- C. Pipe columns shall conform to ASTM A53, Grade B
- D. Tube members shall conform to ASTM A500, Grade B.
- E. All welding shall be done using the shielded electric arc process by AWS certified welders using AWS A5.1, E70XX electrodes.

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- F. All welds used in primary members and connections in the lateral force systems shall be made with a filler metal that has a minimum Charpy V-notch toughness of 20 ft.-lbs. at minus 20 degrees F., as determined by AWS classification.
- G. Continuous inspection is required for all field and shop welding by an Inspector approved by the Division of the State Architect.
- H. Bolts shall conform to ASTM A325, unless noted otherwise.
- I. Structural Steel Shop Drawings shall be reviewed by the Structural Engineer prior to fabrication.
- J. Light gauge steel members shall conform to ASTM A653, Grade A.
- K. Recycled Content – Provide products with an average recycled content of steel so postconsumer recycled content plus one-half of postconsumer content is not less than 50%

2.02 LIGHT STRUCTURAL STEEL

- A. Standard specifications for Hot-Formed Welded and seamless Carbon Steel Structural Tubing, ASTM A500 Grade B.

2.03 WELDING ELECTRODES

- A. Conform to AWS, Latest Edition, AWS 1.1.
 - 1. Required strength of weld shall comply with CBC Title 24, Part 2, Sections 2212A.2.3 and 2213A.

2.04 GALVANIZING

Galvanize all structural steel exposed to weather, unless otherwise noted on plans.

- A. Provide hot-dip galvanizing in accordance with ASTM A123, Grade 90.
- B. Field Galvanizing: Provide ZRC, or other approved.

2.05 PRIMER

- A. Exterior Primer - Provide Themec Series 10, a zinc-chromate, or other approved. Primer shall have a VOC content of 100 g/l (0.83 lb/gal) or less when calculated according to 40 CRF 59, Subpart D (EPA method 24).
- B. Interior Primer – Provide interior primer 734149X red oxide by Rodda Paint Co., or equal. Primer shall have a VOC content of 100 g/l (0.83 lb/gal) or less when calculated according to 40 CRF 59, Subpart D (EPA method 24).
- C. Clean, prepare and shop prime exterior members in accordance with SSPC-Paint 20 or SSPC-Paint 29 and compatible with top coats indicated on plans. Do not prime specific surfaces to be welded or which will be in direct contact with concrete or other cementitious materials.

- D. Clean, prepare and shop prime interior members in accordance with SSPC-Paint 23 and compatible with top coats indicated on plans. Do not prime specific surfaces to be welded or which will be in direct contact with concrete or other cementitious materials.

2.06 WELDED STUDS

- A. All welded studs shall be Nelson shear connector studs (ICC ER-2856) or equal.
- B. See Drawings for welded stud locations.

PART 3 - EXECUTION

3.01 EXAMINATION

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

3.02 FABRICATION AND ERECTION

- A. Fabricate and assemble work by skilled workers using sizes and weights shown. Connections are to develop at least strengths shown, unless approved otherwise beforehand. Allow no splices except where shown.
 - 1. Ultrasonic material inspection - ultrasonically test column materials thicker than 1-1/2 inch for laminations within 1 foot (6 inches either side) of a direct groove weld from girder flange connections and column splices.
- B. Drilling, Punching and Reaming: Hole burning to make or enlarge previous holes is not allowed. Prepare required holes in structural steel members for attachment or passage of work of other trades. Where allowed, steel may be punched 1/16-inch larger than the nominal diameter of the bolt when thickness of the steel is equal to or less than the diameter of the bolt plus 1/8-inch. Where the steel is thicker than the diameter of the bolt plus 1/8-inch, the holes must be drilled or sub-punched and reamed. Diameter of the sub-punched holes, and the drill for sub-drilled holes, is to be 1/16-inch smaller than the nominal diameter of bolt to be installed. Precisely locate finished holes to ensure passage of bolts through steel assemblies without drifting. Enlarge holes only by reaming. Poor matching of holes is cause for rejection of work.
- C. Welding: Comply with the requirements of Title 24, Part 2, Sections 1705A.2 and 2204A.1. Perform welding by the electric shielded arc process. Cut out defective welds with a chisel. Clamp or hold materials securely in position for welding. Upon completion, remove slag and clean welds for inspections and painting. Groove and multi-pass welds are required to be continuously inspected.
 - 1. Storage and Care of Electrodes: Ensure that coatings of low hydrogen type electrodes are thoroughly dry when used. Use electrodes taken from hermetically sealed packages within four hours of the time the package is opened. Electrodes not used within this time period, and electrodes which have been exposed more than one hour to air having a relative humidity of 75 percent or greater, are to be dried for at least two (2) hours at 200 to 250 degrees F. before used, or are to be reconditioned according to manufacturer's printed recommendations. Electrodes dried or reconditioned, which are not used within four hours after drying is completed, are to be re-dried before use. Electrodes of

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any classifications that have been wet are not to be used under any conditions.

2. Preparation: Clean surfaces to be welded of paint, grease, scale, and foreign matter. Clean welds each time electrode is changed. Chip entire area of hand guided and controlled flame cut edges before welds are deposited. In general, surfaces made by automatic or mechanically guided and controlled equipment need not be ground or chipped before welded.
 3. Procedures: During assembling and welding, hold components of a built-up member with sufficient clamps or other adequate means to keep parts straight and in close contact. Do no welding in wind until adequate protective screening has been set up.
 4. Characteristics of Welds: After being deposited, brush welds and ensure they exhibit uniform section, smoothness of weld metal, feather edges without undercuts or overlays, and freedom from porosity and clinkers. Ensure through visual inspection at edges and ends of fillet welds there is good fusion and penetration into base metal.
- D. Bolting:
1. Common Bolts: Make connections with common bolts only where indicated.
 2. High Strength Steel Bolting: Where structural joints are made using high strength bolts, load indicator washers, and nuts tightened to a high tension, the materials, method of installation and tension control, types of wrenches to be used, and inspection methods are to conform to specifications for structural jointing using ASTM A325 or A490 bolts established by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation and the following requirements:
 - a. Provide high strength bolts with a suitable identifying mark placed on top of the head before leaving factory.
 - b. Do tightening of nuts with properly calibrated wrenches, load indicator washers, or turn of nut method; the minimum bolt tension for the size of bolt used is to be in accordance with tables listed in the above standards.
 - c. Check calibrated wrenches individually for accuracy at least twice daily for actual conditions of application.
 - d. Mark bolts that have been completely tightened with identifying symbol.
 - e. Install load indicator washers in accordance with AISC specifications and Contract Drawings.
 - f. Ensure that contact bearing surfaces and threads of bolted parts are free of scale, slag, and burrs which could prevent solid seating of parts.
 - g. Bolt lengths are to be grip plus 1-1/4 inch.
 - h. At moment connections perform welding prior to high-strength bolt tightening.

3. Load Indicator Washers: Provide as manufactured/ licensed by Cooper and Turner. They may be used for field installation of high-strength bolts. These washers may not be substituted for any required washer, but may be used in conjunction with required washers. Tightening is to be in accordance with these specifications using high strength bolts. After sufficient bolts in a joint are snugged to draw the members into close contact, tightening should progress from the most rigid part to the free edges until the load indicators on bolts are closed to the required gap of 0.015 inches under bolt heads or 0.010 inches under the nuts. To prevent overtightening and damage to the bolts, do not completely close the gap.
4. Tension Set Bolts, Nuts, and Washers: May be used for field installation of high strength bolts. In multi-bolt joints, tighten nuts in stages, a little at a time, without breaking the spline in any one of them until the final stage, to minimize slackening of the installed bolts.
5. Inspection of high strength bolting shall comply with Title 24, Part 2, Sections 2213A.1 and 1705A.2.
6. Erector to touch-up all welds and bolts after inspection.

E. Erection:

1. Erect structural steel by professional riggers, using proper hoists and equipment, carefully planned and laid out so that cutting shall not be necessary. Erect the work plumb, square and true to line. Provide temporary bracing and guys where necessary to provide for loads and stresses to which the structure may be subjected, including those due to erection equipment and its operation, and leave in place as long as necessary to safeguard parts of the work.
2. Temporary Connections: Securely bolt work to maintain the steel in proper position while bolting and welding is being performed. Align, plumb and level work prior to welding and final bolting.
3. Set column base plates in exact position as to alignment, level and elevation and support on steel wedges or equivalent until grout has properly set. Center of each base is to be true to the column center within 1/16-inch and adjusted to its elevation to 1/32-inch. Exactly level plates on both axes.
4. Sequence: Carry out the erection of steel in the proper sequence with the work of others. Frame, bed and anchor to concrete and related work in accordance with detailed drawings and setting diagrams.
5. Erection Tolerance: Follow AISC except as follows:
 - a. Vertical dimensions measured from top of beams at their connections at any one column, not varying more than 1/4-inch plus or minus per story or, when accumulative from floor to floor, not exceeding 3/8-inch per story exclusive of column shortening due to dead load.
 - b. Floor level is considered level if floor framing members on any one floor measured from top of column connections do not vary by more than 1-1/2 inch plus or minus.

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- c. Plumb displacement center line of columns from established column line, no more than 1 inch toward or away from established center line.
 - d. Horizontal dimension variances governed by column displacement.
 - 6. Perform erection with suitable equipment, of adequate capacity and design with due regard for personnel and public safety and as not to deflect or stress members beyond reasonable limits. Maintain erection and temporary bracing plan at project site in accordance with Title 8, California Code of Regulations.
 - 7. Damaged members during erection: Straighten or replace members which are bent, twisted or damaged as directed. If heating is required in straightening, perform heating by methods which ensure uniform temperatures throughout entire member. When directed, remove members which are damaged to an extent impairing their appearance, strength or serviceability and replace with new members at no additional cost to Owner.
 - 8. Anchor Bolts: Provide with setting drawings and instructions. Verify position of bolts prior to delivery of steel; report errors or deviations for adjustment.
- F. Erection Bracing: Provide erection bracing immediately upon erection of members and leave in place until members are braced by balance of building.

3.03 PROTECTION

A. Protection of Floors and Temporary Flooring:

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

3.04 CLEANING

A. Shop Priming:

- 1. Clean surfaces according to SSPC and AISC recommendations, and apply specified primer to minimum 1.0 dry mil thickness. Ensure that primer is worked into joints.
- 2. Steel to be embedded into cementitious materials, permanently concealed steel surfaces, contact surfaces of high-strength bolted connections, and surfaces to receive fireproofing are not to be primed.

END OF SECTION

SECTION 05 40 00

COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

- A. Work includes: "C" shaped steel framing components as indicated on the Drawings and specified herein.
- B. Related Sections:
 - 1. Structural Steel Framing; refer to Section 05 12 00.
 - 2. Metal Fabrications; refer to Section 05 50 00.
 - 3. Sheet Metal Flashing and Trim; refer to Section 07 62 00.

1.02 SUBMITTALS

- A. Submit copies of manufacturer's product information and installation instructions for each item of framing and accessories.
- B. Submit large scale wall elevations, sections and details, shop drawings and structural calculations for all components and installations not fully dimensioned or detailed in manufacturer's product data.
- C. Scrap collection and recycling plan: Contractor shall prepare and submit a scrap collection and recycling plan for all miscellaneous and structural steel.

1.03 QUALITY ASSURANCE

- A. Component Design: Compute structural properties of framing system components in accordance with AISI Specifications for the Design of Cold-Formed Steel Structural Members; and CBC.
- B. Fire-Rated Assemblies: Where framing units are components of assemblies indicated for a fire-resistance rating, including those required for compliance with governing regulations, provide units which have been approved.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Protect metal framing units and components from rusting and damage. Deliver to project site in manufacturer's unopened containers or bundles fully identified with name, brand, type and grade.
- B. Store off ground in dry, ventilated space or protect with approved waterproof coverings.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Provide materials and products of one of the following manufacturers: Clarkwestern Dietrich Building Systems, US Gypsum, or Inland Building Systems.

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- B. Metal Studs, Joist and Tracks, etc.: Shall comply with the requirements indicated on the structural and architectural drawings in accordance with ICC-ES No. ER-4943P as manufactured by current members of the Steel Stud Manufacturers' Association.

2.02 METAL FRAMING

- A. System Components: With each type of metal framing required, provide manufacturer's standard steel runners (tracks), blocking, lintels, clip angles, shoes, reinforcements, fasteners, and accessories necessary for installation indicated.
- B. Materials and Finishes: Refer to Drawings for size, gage, and physical properties of metal studs.
 - 1. For 16 gage and heavier units, fabricate metal framing components of structural quality steel sheet with a minimum yield point of 50,000 p.s.i.; ASTM A653 Grade D.
 - 2. For 18 gage and lighter units, fabricate metal framing components of commercial quality sheet steel with a minimum yield point of 33,000 p.s.i.; ASTM A653 SQ, A1011, or A1008.
 - 3. Provide galvanized finish to metal framing members and components complying with ASTM A653 for minimum G60 zinc coating.
 - 4. "C" Shape Studs: Provide manufacturer's standard load-bearing steel studs of size, shape, and gage required, with 1.625-inch flange and flange return lip.
 - 5. Steel Stud Track: Unpunched deep leg track, width and gage as indicated on the drawings.
 - 6. Steel Furring Channels: 2-inch, 1-1/2 inch and 3/4 inch cold rolled 16 gage, prime painted.
 - 7. Steel Bridging: "V" bridging, width as required by stud size, 16 gage.
 - 8. Mechanical Fasteners: Equal to Teks screws as indicated or noted on Drawings.

2.03 FABRICATION

- A. Framing components may be prefabricated into panels prior to erection. Fabricate panels plumb, square, true to line and braced against racking with joints welded. Perform lifting of prefabricated panels in manner to prevent damage and distortion in assembly members.
- B. Fastenings: Attach components by welding, bolting, or screw fasteners, as standard with manufacturer.
- C. Wire tying of framing components is not permitted.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to start of installation, review areas of potential interference and conflicts, and coordinate layout and support provisions for interfacing work.

3.02 INSTALLATION

- A. Install framing systems in accordance with drawings, reviewed shop drawings, and manufacturer's recommendations.
- B. Runner Tracks: Install continuous tracks sized to match studs. Align tracks to layout at base and tops of studs. Provide fasteners at corners and ends of tracks. See drawings for details.
- C. Set studs plumb, except as needed for diagonal bracing.
- D. Where stud system abuts structural columns or walls, anchor ends of stiffeners to supporting structure.
- E. Install supplementary framing, blocking and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, heavy trim and furnishings, and similar work requiring attachment to wall or partition. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations and industry standards in each case, considering the weight, loading, and long term effects resulting from the items supported.
- F. Secure studs to top and bottom runner tracks by welding or screw attachment, fastening to both inside and outside flanges.
- G. Frame wall openings larger than 24 inches square with double stud at each jamb of frame except where more than two are shown or indicated in manufacturer's instructions. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jack studs with stud shoes or by welding, and space jack studs same as full height studs of wall. Secure stud system all around to wall opening frame in manner required.
- H. Provide horizontal blocking in stud system, spaced vertically at no more than 4 feet 6-inches, or as recommended by manufacturer whichever is more stringent. Weld at each intersection.

3.03 PROTECTION

- A. Touch-up shop applied protective coatings damaged during handling, fabrication, or installation. Use compatible primer for prime coated surfaces; use galvanizing repair paint for galvanized surfaces.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Completion of miscellaneous metal fabrications such as angles, plates, sheet goods, castings, railings, nosings, ladders, and stairs as indicated on the drawings and specified herein.
- B. Substrates to which fabrications are to be attached or embedded.
- C. Related Sections:
 - 1. Finish painting, see Section 09 90 00.

1.02 REFERENCE STANDARDS

- A. In addition to mandatory compliance with governing bodies and codes having jurisdiction over the project, provide materials complying with the following standards and industry recommendations: ASTM A36, A47, A48, A53, A108, A283, A307, A312, A314, A325, A475, A500, A554, A653, A743, A1008 A1011, B108, B209, B221, SSPC, NAAMM, AND AA.
- B. Materials shall conform to 2019 CBC, Title 24, Part 2, Chapter 22A.

1.03 SUBMITTALS

- A. Submit fabrication shop drawings on items to be provided.
- B. Where other than mill finishes are specified, provide samples of required finish which will be reviewed for color, texture, style, and finish.
- C. Submit mill test reports and chemical analyses of materials bearing heat numbers not required to be tested, in accordance with other sections of these specifications.
- D. Submit testing results in accordance with other sections of these specifications.
 - 1. Provide one tensile, and elongation test, and one bend or flattening test for each five tons or fraction, of each shape and size, for unidentified material.
 - 2. The Owner reserves the right to reject materials, installed or not, which exhibit defects or do not pass inspections or tests.
- E. Scrap collection and recycling plan: Contractor shall prepare and submit a scrap collection and recycling plan for all miscellaneous and structural steel.

1.04 SOURCE QUALITY CONTROL

- A. Inspection and Testing:
 - 1. Testing for steel, welding and fabrication shall be in accordance with California Building Code (CBC), 2019, Title 24, Part 2, Section 1705A.2.

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2. Welding inspection shall be in accordance with Title 24, Part 2, Section 1705A.2.
3. Shop Welding: Ensure that shop welding is performed in an approved, licensed shop. Continuous inspection shall be required as noted in Table 1705A.2.
4. Field Welding: Stress-carrying welds are to be inspected by a qualified welding inspector. Inspections will be paid for by Owner.
5. California Fire Code: CFC Chapter 35.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Structural steel shall comply with ASTM A6 and requirements of Title 24, Part 2, Chapter 22A.
- B. Steel Plates, Shapes and Bars: ASTM A36.
- C. Steel Plates to be Bent or Cold-Formed: ASTM A283, Grade C.
- D. Steel Bars and Bar-Sized Shapes: ASTM A36.
- E. Steel Tubing (Cold-Formed, Welded or Seamless): ASTM A500, Grade B.
- F. Cold-Finished Steel Bars: ASTM A108, grade selected by fabricator.
- G. Cold-Rolled Carbon Steel Sheets: ASTM A1011.
- H. Galvanized Carbon Steel Sheets: ASTM A653, G90 zinc coating.
- I. Gray Iron Castings: ASTM A48, Class 30.
- J. Malleable Iron Castings: ASTM A47, grade as selected.
- K. Steel Pipe: ASTM A53, type as selected, Grade B, black finish, standard weight Schedule 40.
- L. Steel Wire Rope: ASTM A475, zinc coated steel wire strand, size and number of wires required, common grade with Class B zinc coating.
- M. Expanded Aluminum Grating: ASTM B209, alloy 5052.
- N. Aluminum Extrusions: ASTM B221, alloy 6063-T5 except alloy 6063-T6 for pipe.
- O. Aluminum Sheet or Plate: ASTM B209, alloy 6061-T6, mill finish.
- P. Aluminum Castings: ASTM B108, alloy 214.
- Q. Stainless Steel Castings: ASTM A743, CF8 or CF20.
- R. Stainless Steel Pipe: ASTM A312.
- S. Stainless Steel Tube: ASTM A554, Type 302/304.

- T. Stainless Steel Bars: ASTM A314, Type 302/304.
- U. Shop Primer: Tnemec Series 10, or other approved.
- V. Field Galvanizing: Provide ZRC, or other approved.
- W. Arc Welding Electrodes: ASTM A743.
- X. Bolts and Nuts: ASTM A307

2.02 FABRICATION

- A. Verify actual field dimensions prior to fabrication.
- B. Fabricate items with joints neatly fitted and properly secured.
- C. Fit and shop assemble in largest practical sections for delivery to site.
- D. Welding shall comply with CBC 2019 Title 24, Part 2, Section 1705A.2. Employ certified welders in accordance with AWS D1.1 and D1.3. Grind exposed welds smooth and flush with adjacent finished surfaces. Defective welds must be cut out and replaced per AWS D1.1.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts unobtrusively located, consistent with design of structure, except where specifically noted otherwise.
- F. Make exposed joints flush butt type hair-line joints where mechanically fastened.
- G. Supply components required for proper anchorage of metal fabrications. Fabricate anchorage and related components of same material and finish as metal fabrication, unless otherwise specified or shown.
- H. Thoroughly clean surfaces of rust, scale, grease and foreign matter prior to prime painting and galvanizing.
- I. Galvanize all exterior miscellaneous ferrous metal fabrications. Prime and paint, where directed in other specifications or in plans. Do not shop prime surfaces in direct contact with concrete or other cementitious materials, or requiring field welding. Shop prime in two coats. Provide minimum G90 galvanized coating where galvanizing is required. In locations where field welding has been completed, zinc coat all surfaces prior to priming and painting.

2.03 MANUFACTURED UNITS

- A. Ladders: Meet or exceed OSHA.
 - 1. Steel: As Detailed on Drawings - 2 1/2-inches by 3/8-inch side rails and braces; 3/4-inch round rungs. Galvanized after fabrication.
- B. Galvanized Railings for Stairs and Ramps: Provide nominal diameter extra strong steel, galvanized 1-1/4" inch diameter with actual 1.66" inch outside diameter unless otherwise noted per American Institute of Steel Construction. (Wall handrail and guardrail mounted 1-1/2" clear from side walls.)
 - 1. All welded joints and surfaces shall be ground smooth, no sharp or abrasive

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corners, edges or surfaces. Wall surfaces adjacent to handrail shall be smooth.

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2. Handrail brackets shall mount to the bottom of the handrail. The vertical arm of the bracket shall provide a minimum 1-1/2 inches (38 mm) clearance from the top surface of the horizontal surface of the bracket that attaches to the wall.
 3. Top of gripping surfaces of handrails shall be 34" minimum and 38" maximum vertically above walking surfaces, stair nosings, and ramp surfaces. Handrails shall be at a consistent height above such surfaces.
 4. Clearance between handrail gripping surfaces and adjacent surfaces shall be 1-1/2" minimum. Handrail may be located in a recess if the recess is 3" maximum deep and 18" minimum clear above the top of the handrail.
 5. Handrail gripping surfaces shall be continuous along their length and shall not be obstructed along their tops or sides. The bottoms of handrail gripping surfaces shall not be obstructed for more than 20% of their length. Where provided, horizontal projections shall occur 1-1/2" minimum below the bottom of the handrail gripping surface.
 6. Handrail gripping surfaces with a circular cross section shall have an outside diameter of 1-1/4" minimum and 2" maximum.
 7. Handrail gripping surfaces with a non-circular cross section shall have an outside dimension of 4" minimum and 6-1/4" maximum, and a cross-sectional dimension of 2-1/4" maximum.
 8. Handrail gripping surfaces and any surfaces adjacent to them shall be free of sharp or abrasive elements and have rounded edges.
 9. Handrails shall not rotate within their fittings.
 10. Handrail gripping surfaces shall extend beyond and in the same direction of stair flights and ramp runs in accordance with **CBC Section 11B-505.10**. Such extensions are not required for continuous handrails at the inside turn of switchback or dogleg stairs or ramps.
 11. A 2" minimum high curb or barrier shall be provided to prevent the passage of a 4" diameter sphere rolling off the sides of a ramp surface. Such a curb or barrier shall be continuous and uninterrupted along the length of the ramp, per **CBC Section 11B-405.9.2**.
- C. Equipment Support System: Provide Unistrut, or other approved.
1. Main Runner: P5500 channel at 8 foot centers.
 2. 1/2-inch hanging rods at 48 inches on centers and hanger clamps.
 3. Cross Runner: P3000 channel at 4 foot centers.
 4. P3047 "U" shaped fittings.
 5. Provide and size pipe clamps as required.
 6. Provide hardware and accessories as required.
- D. Bollards: Galvanized extra heavy weight (Schedule 80) steel pipe set in a concrete foundation and filled solid with 2000 psi concrete as specified in Section 03 30 00.

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E. Stair Nosing:

1. Design is based on Spectra Safety Treads manufactured by Wooster Products, Inc., or equal. Profiles and types shall be as detailed, or as follows:
 - a. Solid Concrete Stair: Type WP3C with blanked-out anchor Steel Pan Concrete Filled Stairs: Type WP3J, or, other Architect approved product for type of construction.
2. Provide at exterior stairs not scheduled to receive other finish.
3. Treads and Nosings: Provide 2 inch contrasting color warning stripe 1 inch maximum from edge of nosing of each exterior stair and top and bottom nosing only at interior stairs. Color shall be as selected by the Architect.
4. Install nosings flush with top of traffic surface. Nosings shall terminate no more than 4-inches from ends of steps for poured concrete stairs and full length of steps less 1/8-inch clearance at concrete filled steel pan stairs.
5. Interior stairs shall have the upper approach and lower tread marked by a stripe providing clear visual contrast. Exterior stairs shall have the upper approach and all treads marked by a stripe to provide clear visual contrast.
6. The stripe providing clear visual contrast shall be a minimum of 2" wide to a maximum of 4" wide, placed parallel to, and not more than 1" from, the nose of the step or upper approach. The stripe shall extend the full width of the step or upper approach and shall be of a material that is at least as slip-resistant as the other treads of the stair. A painted stripe shall be acceptable. Groves shall not be used to satisfy this requirement.
7. The radius of curvature at the leading edge of the tread shall be no greater than 1/2". Nosings that project beyond the risers shall have the underside of the leading edge curved or beveled. The maximum angle for a riser to slope under the tread shall be 30 degrees from vertical. Nosings shall extend 1-1/4" maximum over the tread below.
8. Treads shall be 11" deep minimum. Risers shall be 7" high maximum and 4" high minimum. All steps on a flight of stairs shall have uniform riser heights and uniform tread depths. Open risers are not permitted.

F. Trench Covers, Expansion and Seismic Joint Covers:

1. Acceptable Manufacturers:
 - a. Construction Specialties, Inc., a member of the C/S Group, Los Angeles.
 - b. MM Systems Corporation, Pendergrass, Georgia.
 - c. Balco USA, Inc., Wichita, Kansas.
2. Joint Covers: Equal to C/S AFW Series extruded aluminum finished to match predominant adjacent material. Provide compatible shapes and configurations at intersecting floor, wall, and ceiling conditions where required.
3. Trench Cover: Equal to MM Systems, Model No. Architect to specify. Trench cover plate recessed for VCT Flooring.

4. Install work in accordance with manufacturer's recommendations. Runs shall be in continuous lengths without butt joints.
- G. Floor Door: Provide exterior type single-leaf, extruded aluminum floor door, equal to Dur-Red Products, Model No. SEA, 24-inches by 24-inches in size.
1. Door Leaf: 1/4-inch thick diamond pattern floor plate with reinforcing strips, to support 150 pounds per square foot.
 2. Frame: 1/4-inch thick extruded aluminum angle frame, fully welded, with anchor straps.
 3. Hardware: 1/4-inch thick heavy stamped hinge bolted to frame, torsion bars, one-point latch, inside and outside handles, and automatic hold-open arm with vinyl grip.
 4. Finish: Prime coat applied to aluminum frame and leaf.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Surface Conditions: Inspect surfaces and work in place by others, and verify that such work is in a condition appropriate to receive work of this section. Do not apply or install work of this section until unsatisfactory work of others is in a condition which will ensure the correct installation of materials and products of this section.

3.02 INSTALLATION

- A. Obtain approval of Architect prior to site cutting or making adjustments which are not part of intended work, or are not shown on shop drawings.
- B. Install items square and level, accurately fitted and free from distortion and defects.
- C. Make provisions for erection stresses by temporary bracing. Keep work in alignment.
- D. Replace items damaged during installation.
- E. Perform field welding in accordance with AWS D1.1.
- F. After installation, touch-up field welds and scratched and damaged paint, or coated surfaces. Use primer and paint consistent with shop finish.
- G. Supply and assist with setting items requiring to be cast into concrete, or embedded in masonry, complete with necessary setting templates.
- H. Stairs:
1. Ensure that stair stringer supports are square or rectangular steel tubing or steel channels.
 2. Unless shown otherwise, treads are to be pan type, with galvanized coating.
 3. Where required, provide support sleeves for handrails.

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4. Provide adequate strength and stiffness to limit deflection on every stair tread and landing such that when a 300-pound person places entire weight on stair tread or landing, deflection is limited to 1/8-inch maximum at point.
5. Prime paint surfaces of stair assembly after fabrication, and grind smooth welds as specified.
6. Secure handrails to stair and steel supports where shown, at top or bottom with screws or welds, and achieve a lateral resistance as required by California Building Code (CBC).

3.03 CLEANING

- A. Clean site after work of this section.
- B. Remove weld splatters.
- C. Use galvanizing repair coating specified, then re-prime areas of materials damaged during installation and other construction activities, and leave in condition for subsequent finish painting or application of additional finish materials provided by others.

END OF SECTION

06 00 00

WOODS, PLASTICS, AND COMPOSITES

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SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Wood framing, miscellaneous furring for wall finishes, miscellaneous blocking and rough hardware.
- B. Related Sections:
 - 1. Finish Hardware, see Section 08 71 00 – Door Hardware.
 - 2. Millwork and other finish carpentry.

1.02 REFERENCE STANDARDS

- A. Softwood Lumber: PS 20 - American Softwood Lumber Standard.
- B. NFPA - National Forest Products Association, National Design Specifications for Stress Grade Lumber and its Fastening.
- C. West Coast Lumber Inspection Bureau (WCLIB), Standard No. 17 Grading Rules for West Coast Lumber.
- D. Chapter 23, Part 2, Section 2303, Title 24, California Building Code, 2019.
- E. Chapters 7, 23 and 35, California Building Code, 2019.
- F. Plywood: U.S. Product Standard PS 1-09.
- G. Lumber: U.S. Product Standard, PS 20-10.

1.03 QUALITY ASSURANCE

- A. Provide lumber with visible grade stamp of an approved agency certified by NFPA.

1.04 DELIVERY, STORING AND HANDLING

- A. Deliver and store materials at job site in a safe area, out of traffic and shored up, off ground surface.
- B. Identify framing lumber by grades and store grades separately from each other.
- C. Protect products with adequate waterproofing.
- D. Exercise care in off-loading lumber to prevent damages, splitting and breaking.
- E. Seasoning:
- F. Deliver materials at earliest date possible to allow maximum; drying time on site.
- G. Pile and strip lumber at site to allow free circulation of air with pile protected from sun and moisture.

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- H. Air-season lumber for at least 60 days before covering with finish materials.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Lumber: PS 20 and WCLIB Standard Number 17; Douglas Fir/Larch; graded in accordance with NFPA Grading Rules; maximum moisture content of 19 percent, grades as scheduled on drawings.
1. Douglas fir shall bear WCLIB grade stamp.
 2. Pressure treated Douglas fir shall be No. 2 minimum and bear the AWPA quality mark. Cuts and holes shall be treated per AWPA Standard U1 (statements such as "or to refusal" are not permitted).
 3. Comply with provisions of Title 24, CBC, 2019, Part 2, Section 2303.
- B. Plywood:
1. Plywood for Roofs, Walls, and Floor Sheathing: PS 1-09 Structural I grade, APA C-D, exterior glue, except B-D for electrical and telephone panels.
 2. Comply with CBC, 2019, Section 2303.
 3. Roof and shearwall plywood shall be nominally 4 ft. x 8ft. in size. Do not use sheets less than 8 square feet, nor less than dimensions noted in paragraph 3.08 Plywood Placement.

2.02 ACCESSORY MATERIALS

- A. Nails, Spikes, and Staples: Common (with standard lengths), except as otherwise indicated, galvanized for exterior locations, high humidity within conditioned spaces, and treated wood; plain finish for other interior locations; size and type to suit application.
- B. Steel Hardware and Stock Framing Products by Connectors: ASTM A36 steel, galvanized for exterior applications, Simpson Strong-Tie Company. Products by KC Metal Products, or other approved manufacturer, may be substituted if equal. Comply with CBC, 2019, Title 24, Part 2, Chapter 23.
- C. Lag Bolts: ANSI/ASME B18.2.1 and ASME B18.18.1.
- D. Wood Preservative: Wolmanizing treatment at least two weeks prior to delivery to site. Treatment shall meet or exceed AWPA P5.
- E. Machine Bolts: ASTM A307.
- F. Pressure Treatment: Sills and plates in contact with concrete or masonry within 48 inches of the ground, and wood posts and columns bearing directly on concrete shall be water-borne preservative pressure treated in accordance with paragraph, CBC 2019, Title 24, Part 2, Chapter 23.

1. At cuts, holes, notches and other field operations which expose a surface not factory treated with preservative, field apply preservative material compatible with original material shall bear mark AWWPA Standard U1.
2. Meet local Air Quality Control Board Standards for field applied preservative treatment.

PART 3 - EXECUTION

3.01 EXAMINATION

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

3.02 GENERAL FRAMING

- A. In addition to framing operations normal to fabrication and erection indicated on drawings, install wood backing required for work of other trades, and for casework, chalkboards, toilet partitions and etc. as required. Wood backing to be installed in high traffic and high impact areas.
- B. Set horizontal and sloped members with crown up.
- C. Non-bearing stud walls, sills, and trimmers may be anchored to concrete per Structural Drawings.
- D. Wall and partition studs and mullions shall be continuous from sill to plates. Run at least two studs on each side of openings in stud walls for openings in exterior walls and in partition openings larger than 5 feet, and partitions from sill to plate. In addition, place one stud trimmer to support each end of lintels over openings, unless shown otherwise.
- E. Provide double plates with joints staggered and lapping at least four feet, and splice. Nail as required on Drawings.
- F. Install nailing blocks and backing necessary for attachment of grounds, finishes, trim, fixtures, and do required cutting, furring, and backing for plumbing and heating pipes, fixtures, etc., as detailed in the Drawings or approved by the Structural Engineer and approved by the Division of the State Architect, Office of Regulations Services.
- G. Frame stud partitions, furring and walls containing fire extinguisher cabinets, electric panels, plumbing, heating, or other pipes to give proper clearance. Cutting of studs in bearing partitions and shear walls is prohibited unless specifically detailed.
- H. Do not place pipes exceeding 1/3 of plate width in partitions used as bearing or plywood-sheathed walls, but place them in furring completely clear of studs, unless detailed otherwise. Place approved piping in center of plates using neat hole. No notching is allowed. In no case allow pipes to pass through plates less than 5-1/2 inches wide.

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- I. Unless otherwise indicated provide 2 inch by 6 inch studs at 16-inches on centers. Refer to Structural Drawings for Simpson Metal Strap Ties, strap length, nail size and nail spacing where plates are broken.
- J. Provide cross-bridging at 10 feet on centers maximum for all joists and rafters more than 10-inches deep. Use wood 2 inch by full depth of joist or rafter or approved metal type bridging. Nail metal bridging.
- K. Provide isolated posts with connections at top and bottom; Simpson CC caps or CB base unless specifically detailed otherwise.
- L. Double joists under parallel partitions with solid blocking between joists over points of support.
- M. Provide a Simpson "CB" Steel Base Plate for untreated wood posts where they are or will be in contact with concrete.
- N. Framing for horizontal plaster assemblies shall comply with the requirements of CBC 2019, Title 24, Part 2, Section 2507.

3.03 FIRE BLOCKING

- A. Fire blocking shall conform with the requirements of CBC 2019, Title 24, Part 2, Chapter 7, Section 713.
- B. Ensure that no fire stop is less than nominal 2 inches thick and no less in width than enclosed space within partition.
- C. Provide stud wall and partitions with continuous rows of bridging or fire stops which will form a complete and effective separation in entire width of partitions, placed in such a manner that there will be no concealed air spaces greater than 8 feet in vertical dimension. Intermediate stops may be in line with opening headers. Provide furred space between stud walls and partitions with continuous fire stops at same elevation as those in the enclosing walls which must be installed horizontally, thus forming a solid stop from outside to outside of studs. At concealed draft passages or shafts including furring spaces, ensure that maximum dimension is no more than 8 feet. Provide fire stop partitions at suspended ceilings.

3.04 BEARINGS

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

3.05 SHIMMING

- A. Do not shim framing member except where specifically shown or required by drawings.

3.06 BLOCKING

- A. Install blocking required to support items of finish and to cut off concealed draft openings, both vertical and horizontal, between ceiling and floor.

3.07 ALIGNMENT

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

3.08 PLYWOOD PLACEMENT

- A. All installed plywood shall be in 4' x 8' sheets except where restricted by boundaries or changes.
- B. Minimum Plywood Panel Sizes shall be as follows:
 - 1. In horizontal plywood diaphragms, no panel less than 24 inches wide or 48 inches long shall be used.
 - 2. In vertical plywood diaphragms, no panel less than 16 inches wide shall be used.
- C. Center joints accurately over support unless otherwise shown on Drawings. Provide gapping of plywood substrate of 1/8-inch at abutting joints at all wall.
- D. Protect plywood from moisture until succeeding component or materials are installed to cover plywood. Delaminating plywood shall be removed and replaced.

3.09 FASTENING

- A. Use only common wire nails or spikes of standard lengths and gages as specified Table 2304.10.1, of the California Building Code, 2019.
- B. For conditions not covered on drawings, Contractor to request clarification or provide penetration into piece receiving point not less than 1/2 length of the nail or spike, provided that 16d nails may be used to connect two pieces of nominal 2 inch thickness as specified by the Architect, and/or Structural Engineer and approved by the Division of the State Architect.
- C. For bolts, drill holes 1/32-inch to 1/16-inch larger in diameter than bolts being used. Drill straight and true from one side only.
- D. Bolt threads shall not bear on wood. Use washers under head and nut where both bear on wood. Use washers under nuts.
- E. For lag-screws, and wood screws, pre-bore holes in accordance with CBC 2019, Title 24, Part 2, Chapter 23.
- F. Screw, do not drive, lag screws and wood screws.
- G. Nailing schedule shall be per CBC 2019, Title 24, Part 2, Chapter 23.

3.10 HOLLOW METAL FRAME GROUTING

- A. At all exterior hollow metal jambs, drypack/grout the bottom 6-inch space between the hollow metal and 6-inch concrete curb at the wall. The intent is to fill solid the void between the frame and concrete curb. Install drypack/grout before any finishes are applied to the studs.

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END OF SECTION

SECTION 06 20 00

FINISH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Handrails, chair-rails, trim, and soffits.
- B. Related Sections:
 - 1. Rough Carpentry; refer to Section 06 10 00.
 - 2. Specialties; refer to Division 10.

1.02 REFERENCE STANDARDS

- A. Woodwork Institute, 2nd Edition, 2014 Architectural Woodwork Standards, has recommendations for materials, construction, and installation procedures.
- B. West Coast Lumber Inspection Bureau (WCLIB), Standard No. 17 Grading Rules for West Coast Lumber.

1.03 QUALITY ASSURANCE

- A. Provide millwork fabricated in accordance with recommendations of Woodwork Institute. Fabricated millwork shall be certified and grades stamped with Woodwork Institute certification.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store materials at job site in a safe area, out of traffic and shored up off ground surface.
- B. Do not store millwork outside. Do not deliver millwork to project until spaces or other surfaces to receive it are prepared.
- C. Protect products with adequate waterproofing.
- D. Exercise care in off-loading items to prevent damages, chips, splitting and breaking.

1.05 PROJECT CONDITIONS

- A. Seasoning:
 - 1. Deliver materials at earliest date possible to allow maximum drying time on site.
 - 2. Air-season lumber for at least 60 days near job site before covering with finish materials.

1.06 SUBMITTALS

- A. Provide manufacturer's standard color samples of plastic laminate (where applicable) and hardwood veneers for color and grain selection.

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- B. Provide Woodwork Institute Certified Compliance Certificates for millwork items, certifying that products fully comply with requirements of the grades specified.
- C. Prepare Shop Drawings in accordance with Section 1 of the WI Standards referenced. Include the Woodwork Institute Certified Compliance label on the first page of each set of Shop Drawings.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Finish Lumber: Graded in accordance with Western Wood Products Association Grading Rules; maximum moisture content of 15 percent.

<u>ITEM</u>	<u>SPECIES</u>	<u>GRADE</u>
Misc. Trim	Red Oak, rift cut	Custom
1 x 4 tongue and groove siding	Redwood	Grade A, square edge, random length.

2.02 ACCESSORIES

- A. Nails, Spikes, and Staples: Common, except as otherwise indicated, galvanized for exterior locations, high humidity within conditioned spaces, and treated wood; plain finish for other interior locations; size and type to suit application.
- B. Lag Bolts: ANSI/ASME B18.2.1 and ASME B18.18.1.
- C. Machine Bolts: ASTM A307
- D. Wood Preservative: Wolmanizing treatment at least two-weeks prior to delivery to site.

2.03 FABRICATION

- A. Manufacture, mill, fabricate, assemble and finish millwork by skilled mechanics, using approved standard methods of manufacture and workmanship. Workmanship shall conform to the Custom Grade requirements of Woodwork Institute Manual referenced.
- B. Conceal means of fastening where other than glue joinery is employed. Use fine casing nails, carefully set without hammer marks.
- C. Level tops of counters and cabinetry to a tolerance of 1/32-inch in 4 feet in direction.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Selection of Lumber: Carefully select members so that defects will not interfere with proper nailing or making proper connections, and not impair achievement of proper finished appearances where to be exposed.

3.02 INSTALLATION

- A. Installation of finish carpentry and millwork shall be in accordance with the applicable recommendations of the Woodwork Institute Manual, current edition, Architectural Woodwork Standards.
- B. Install building specialty items specified under other sections which are not specified to be installed by specialty product manufacturer or supplier.

END OF SECTION

07 00 00

THERMAL AND MOISTURE PROTECTION

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SECTION 07 10 00

DAMPPROOFING AND WATERPROOFING

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes: Waterproofing membrane systems for below-grade, vertical and horizontal applications, around pits, and beneath finish flooring systems over occupied, or to-be-occupied areas, as indicated on the drawings and specified herein.
- B. Related Sections:
 - 1. Roofing: see Division 7 – Thermal and Moisture Protection.
 - 2. Traffic membranes

1.02 GUARANTEE

- A. Provide a (10) ten-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 all costs of exposing and recovering membrane, and consequential damages to persons and property resultant of defective materials or workmanship.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Horizontal Locations:
 - 1. Provide a fluid applied, self-leveling, polyurethane system such as Sonneborn® HLM 5000 manufactured by BASF, Vulkem 201L manufactured by Tremco, or Perma-Gard III manufactured by Neogard.
 - 2. Horizontal Protection Course: Sonneborn Protection Course II manufactured by BASF, or "Sealtight PC-2" by W.R. Meadows.
- B. Vertical locations – W.R. Meadows, Hydrolastic 836 Waterproofing Membrane, or equal.

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. Filter Fabric Installation:
 - 1. Install the filter fabric facing out toward the backfill (the direction from which the water will come).
 - 2. Panels shall be lapped by a minimum of 2 rows of dimples (2 inches) on all

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edges. Both the core and the filter fabric should be shingled in the direction of the water flow.

3. Attach the drain using a general construction grade adhesive, pressure -sensitive adhesive, or a mastic used for membrane applications. The membrane and drain core should be clean and dry. Care should be taken that the adhesive is compatible with the damp-proofing material or waterproofing membrane and the drain core.
 4. At the footing, place the core behind the perimeter drain tile and wrap the filter fabric around it and up behind the drain core.
 5. The drain shall be cut with a sharp knife or shears.
 6. Tuck the filter fabric behind the core to cover exposed edges.
 7. Tears or punctures in fabric shall be covered with new filter fabric.
 8. Backfill as soon as possible taking care not to over compact.
- D. Provide reinforcing strips, and backer rods necessary for joints and cracks.
- E. Flood Testing Drains: Flood test each drain for leaks, after completing roofing and flashing but before overlying construction is placed. Plug or dam drains, and flood with potable water.
1. Flood to an average depth of 1-1/2 inches not exceeding a depth of 2.5 inches.
 2. Flood each area for 24 hours.
 3. After flood testing, repair leaks, repeat flood tests and make further repairs until roofing and flashing installations are watertight.
- F. Additional Testing: Set a sprinkler on the roof and run for approximately 1 hour, then move to a new section. Provide an observer below the roof substrate to identify any water intrusion.
1. After flood testing, if water intrusion is noted, repair leaks, repeat flood tests, and make further repairs until drain and flashing installations are watertight.

3.02 FIELD QUALITY CONTROL

- A. Tests: Once systems (except horizontal protection course) are installed, applications shall be water tested. Perform in such a way that watertight integrity is fully demonstrated with standing water for at least 24 hours. Allow Architect and Owner to witness this test. Correct defects, then re-test. Continue this procedure until no leaks exist.

END OF SECTION

SECTION 07 21 00

THERMAL INSULATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Thermal, fire, and acoustical insulation and isolation materials as indicated on the Drawings and specified herein.
- B. Related Sections:
 - 1. Framing to which insulation is to be attached, see Division 5 and Division 6.
 - 2. Roofing: see Division 7.

1.02 REFERENCE STANDARDS

- A. Ensure installation compliance with CBC, Title 24.
- B. ASTM C553 and E84.

1.03 SUBMITTALS

- A. Submit manufacturer's product literature and installation instructions for each type of insulation material required.
- B. Submit certified test reports showing compliance with performance values, including r-ratings (aged for plastic insulations), densities, compression strengths, fire performance characteristics, perm ratings, water absorption ratings and similar properties.
- C. Submit CHPS or LEED certification for recycled content and low emitting materials.

1.04 QUALITY ASSURANCE

- A. Provide a certification of insulation and post on project, stating that work of this section conforms to the requirements of this section of specifications and Title 24.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Batt Insulation at Horizontal Locations:
 - 1. Provide CertainTeed Corporation, CertaPro Batts, Kraft Faced, or Foil Faced, flanged, in thicknesses necessary to meet aged R-30 value (unless otherwise noted), expressed as average in and out value. Chips certified for low emitting and recycled content.
 - 2. Flame Spread Rating: 25 or less in accordance with ASTM E84.
 - 3. Smoke Density Developed Rating: 50 or less in accordance with ASTM E84.
- B. Batt Insulation at Vertical Locations:
 - 1. Provide CertainTeed Corporation, CertaPro Batts, Kraft Faced, or Foil Faced,

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flanged (or approved equal), in thickness necessary to meet aged R-19 value (unless otherwise noted), expressed as average in and out value. Chips certified for low emitting and recycled content.

2. Flame Spread Rating: 25 or less in accordance with ASTM E84.

Note: Specified R-values are for materials only and are not to include installation values.

3. Smoke Density Factor: Not to exceed 450.

C. Acoustical Insulation:

1. Provide CertainTeed Corporation, CertaPro Batts, Plain, fiberglass batts (or approved equal), minimum of 3-1/2 inches thick, installed as specified in indicated assemblies.
2. Flame Spread Rating: 25 or less in accordance with ASTM E84.
3. Smoke Density Factor: Not to exceed 450.
4. Provide acoustical insulation in all interior partitions and extend insulation to underside of roof structure.

- D. Fire Safing: Provide USG Thermafiber® Fire Safing Insulation, or other approved, where fire safing material is shown, or required. Thermafiber® Safing™ resists temperatures to 2,000°F. (1,093°C) and is noncombustible.

2.02 COMPONENTS

- A. Acoustical Isolators: Provide isolating and acoustical clamps and sleeves manufactured by Specialty Products & Insulation Company, or other approved, as approved by local codes.

2.03 ACCESSORIES

- A. Sag Wires: At all types of batt insulation, provide 18 gage galvanized wire at 16 inches on center. Staple wire at wood structure or sheet metal screw to metal structure to underside of structure, minimum three (3) per connection. Sag wires are not required where gypsum board is attached to the underside of roof framing.
- B. Impaling and stick-pins, including washers, are to be provided as recommended in writing by insulation manufacturer.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Batt Insulation:
1. Insulate exterior areas adjacent and contiguous to spaces unheated, except where shown otherwise by Drawings.
 2. Ensure secure attachment so that insulation will not sag over time. Friction fitting

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is not sufficient. Mechanically attach insulation. Double sided tape attachment is not acceptable.

- a. Install foil and paper facing on warmer side of area being insulated.
- b. Where insulated walls and underside of structure are being left exposed and unfinished, install sag wires at 16" o.c. (minimum) to support insulation.
- c. Where insulation is being installed using impaling pins, ensure that washers are installed over pins after insulation is in place. Space pins as necessary to provide insulation installation which will not sag over time, and as recommended in writing by insulation manufacturer.

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4. Ensure the continuous insulation of the building envelope. Tape joints, both ends and sides.
5. Provide two layers of insulation lapping openings by 14 inches or more where intended to be of sound resistive construction at locations such as telephone outlets, electrical, mechanical, or plumbing penetrations.

3.02 DEMONSTRATION

- A. Comply with State of California Noise Insulation Standards.
- B. Upon completion of installation of building envelope, certify compliance with requirements for Title 24.

END OF SECTION

SECTION 07 54 00

POLYVINYL CHLORIDE MEMBRANE ROOFING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Scope – Install a complete adhered Carlisle Goldenseal total roofing system, where and roof penetrations, or repair is necessary. No substitutions. Existing roof is under warranty. Contact A Good Roofer, (619) 561-7600. Roofing system shall include membrane, flashings and other components, as noted on the plans.

- B. Related Work - The work includes but is not limited to the installation of:
 - 1. Removal of Existing Roofing and Insulation
 - 2. Substrate Preparation
 - 3. Roof Drains
 - 4. Vapor Barrier
 - 5. Wood Blocking
 - 6. Insulation
 - 7. Separation Layers
 - 8. Roof Membrane
 - 9. Fasteners
 - 10. Adhesive for Flashings
 - 11. Roof Membrane Flashings
 - 12. Walkways
 - 13. Metal Flashings
 - 14. Sealants

- C. Upon successful completion of work the following warranties must be submitted:
 - 1. Manufacturer's Warranty through 2033.
 - 2. Roofing Applicator Warranty through 2033.

1.02 QUALITY ASSURANCE

- A. This roofing repair shall be applied only by a Good Roofer.

- B. There shall be no deviation made from the Project Specification or the approved shop drawings without prior written approval by the Owner, the Owner's Representative and Carlisle Roofing.

- C. All work pertaining to the installation of roofing membrane and flashings shall only be completed by Applicator personnel trained and authorized by Carlisle, or equal in those procedures.

1.03 SUBMITTALS

- A. At the time of bidding, the Applicator shall submit to the Owner (or Representative) the following:
 - 1. Specific adherence to specification guideline.

 - 2. Samples of each primary component to be used in the roof system and the manufacturer's current literature for each component.

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3. Written approval by the insulation manufacturer for use and performance of the product in the proposed system.
4. Sample copy of manufacturer's warranty.
5. Sample copy of Applicator's warranty.
6. Dimensioned shop drawings which shall include:
 7. Outline of roof with roof size and elevations shown.
 8. Details of flashing methods for every penetration and flashing condition.
- B. Certifications by manufacturers of roofing and insulating materials that all materials supplied comply with all requirements of the identified ASTM and other industry standards or practices.
- C. Certification from the Applicator that the system specified meets all identified code and insurance requirements as required by the Specification.
- D. Material Safety Data Sheets (MSDS)

1.04 CODE REQUIREMENTS

- A. The Applicator shall submit evidence that the proposed roof system meets the requirements of the local building code and has been tested and approved or listed by the following test organizations. These requirements are minimum standards and no roofing work shall commence without written documentation of the system's compliance, as required in the "Submittals" section of this specification.
- B. System shall be designed to meet a minimum wind design requirements of the most recent version of ASCE 7.
- C. Factory Mutual Research Corporation (FM) - Norwood, MA
 1. Class 1-90 (for high wind exposure)
- D. Underwriters Laboratories, Inc. - Northbrook, IL
 1. Class A assembly

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. All products delivered to the job site shall be in the original unopened containers or wrappings bearing all seals and approvals.
- B. Handle all materials to prevent damage. Place all materials on pallets and fully protect from moisture.
- C. Membrane rolls shall be stored lying down on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weldability.
- D. As a general rule all adhesives shall be stored at temperatures between 40-degree F (5 degree C) and 80 degree F (27 degree C). Read instructions contained on adhesive

canister for specific storage instructions.

- E. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material manufacturer/supplier.
- F. All materials which are determined to be damaged by the Owner's Representative or Carlisle representative are to be removed from the job site and replaced at no cost to the Owner.

1.06 JOB CONDITIONS

- A. Carlisle materials may be installed under certain adverse weather conditions but only after consultation with manufacturer as installation time and system integrity may be affected.
- B. Only as much of the new roofing as can be made weathertight each day, including all flashing and detail work, shall be installed. All seams shall be heat welded before leaving the job site that day.
- C. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against all risks.
- D. All surfaces to receive new insulation, membrane or flashings shall be dry. Should surface moisture occur, the Applicator shall provide the necessary equipment to dry the surface prior to application.
- E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.
- F. Uninterrupted waterstops shall be installed at the end of each day's work and shall be completely removed before proceeding with the next day's work. Waterstops shall not emit dangerous or unsafe fumes and shall not remain in contact with the finished roof as the installation progresses. Contaminated membrane shall be replaced at no cost to the Owner.
- G. The Applicator is cautioned that certain Carlisle membranes are incompatible with asphalt, coal tar, heavy oils, roofing cements, creosote and some preservative materials. Such materials shall not remain in contact with Carlisle membranes. The Applicator shall consult Carlisle regarding compatibility, precautions and recommendations.
- H. Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the Applicator shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. A substantial protection layer consisting of plywood over Carlisle or plywood over insulation board shall be provided for all new and existing roof areas that receive rooftop traffic during construction.
- I. Prior to and during application, all dirt, debris and dust shall be removed from surfaces either by vacuuming, sweeping, blowing with compressed air or similar methods.
- J. The Applicator shall follow all safety regulations as required by OSHA and any other applicable authority having jurisdiction.
- K. All roofing, insulation, flashings and metal work removed during construction shall be

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immediately taken off site to a legal dumping area authorized to receive such materials. Hazardous materials, such as materials containing asbestos, are to be removed and disposed of in strict accordance with applicable City, State and Federal requirements.

- L. All new roofing waste material (i.e., scrap roof membrane, empty cans of adhesive) shall be immediately removed from the site by the Applicator and properly transported to a legal dumping area authorized to receive such material.
- M. The Applicator shall take precautions that storage and application of materials and equipment does not overload the roof deck or building structure.
- N. Flammable adhesives and deck primers shall not be stored and not be used in the vicinity of open flames, sparks and excessive heat.
- O. The Applicator shall verify that all roof drain lines are functioning correctly (not clogged or blocked) before starting work. Applicator shall report any such blockages in writing to the Owner's Representative for corrective action prior to the installation of the roof system.
- P. Applicator shall immediately stop work if any unusual or concealed condition is discovered and shall immediately notify Owner of such condition in writing for correction.
- Q. Site cleanup, including both interior and exterior building areas that have been affected by construction, shall be completed to the Owner's satisfaction.
- R. All landscaped areas damaged by construction activities shall be repaired at no cost to the Owner.
- S. The Applicator shall conduct fastener pullout tests in accordance with the latest version of the SPRI/ANSI Fastener Pullout Standard to verify condition of the deck/substrate and to confirm expected pullout values.
- T. The Carlisle membrane shall not be installed under the following conditions without consulting Carlisle Technical Dept. for precautionary steps:
 - 1. The roof assembly permits interior air to pressurize the membrane underside.
 - 2. Any exterior wall has 10 percent or more of the surface area comprised of opening doors or windows.
 - 3. The wall/deck intersection permits air entry into the wall flashing area.
- U. Precautions shall be taken when using any adhesives at or near rooftop vents or air intakes. Adhesive odors could enter the building. Coordinate the operation of vents and air intakes in such a manner as to avoid the intake of adhesive odor while ventilating the building. Keep lids on unused cans at all times.
- V. Protective wear shall be worn when using solvents or adhesives or as required by job conditions.
- W. Membranes are slippery when wet or covered with snow, frost, or ice. Working on surfaces under these conditions is hazardous. Appropriate safety measures must be implemented prior to working on such surfaces. Always follow OSHA and other relevant fall protection standards when working on roofs.

1.07 BIDDING REQUIREMENTS

- A. Pre-Bid Meeting:

A pre-bid meeting shall be held with the Owner's Representative and involved trades to discuss all aspects of the project. The Applicator's field representative or roofing foreman for the work shall be in attendance. Procedures to avoid rooftop damage by other trades shall be determined.

B. Site Visit:

Bidders shall visit the site and carefully examine the areas in question as to conditions that may affect proper execution of the work. All dimensions and quantities shall be determined or verified by the Applicator. No claims for extra costs will be allowed because of lack of full knowledge of the existing conditions unless agreed to in advance with the Owner or Owner's Representative.

1.08 WARRANTIES

- A. Manufacturer's Membrane Warranty – through 2033.
- B. Manufacturer's Standard System Warranty – all products installed shall be covered by a standard warranty through 2033.
- C. Applicator/Roofing Contractor Warranty – Applicator's/Contractor's warranty shall be 30 years. Applicator/Contractor shall supply Owner with a separate workmanship warranty. In the event any work related to roofing, flashing, or metal is found to be within Applicator warranty term, defective or otherwise not in accordance with Contract Documents, the Applicator shall repair that defect at no cost to the Owner. Applicator's warranty obligation shall run directly to the Owner, and a copy shall be sent manufacturer.
- D. Owner Responsibility - Owner shall notify the contractor of any leaks, within one month, as they occur during the time period when both warranties are in effect.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Manufacturer: The components of the Carlisle Adhered roof system, or equal, are to be products of Carlisle as indicated on the Drawings and specified in the Contract Documents.
- B. Other acceptable manufacturers: none

2.02 MEMBRANE

- A. Match existing roofing system

2.03 FLASHING MATERIALS

- A. Wall/Curb Flashing, Perimeter edge flashing, miscellaneous flashing – match existing roofing system.
 - 1. Sarnacorners – Universal - Prefabricated outside and inside flashing corners made of 0.060 inch (60 mil/1.5 mm) thick membrane that are heat-welded to membrane or Sarnaclad base flashings.
 - 2. Open Post Flashing - Prefabricated post flashing, 0.048 inch (48 mil/1.2 mm) thick, with an open seam used to flash obstructed rooftop conduits and pipes ½.

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3. Sikaflex-1a Sealant

2.04 INSULATION/OVERLAYMENT/RECOVER BOARD

- A. 2 layers of rigid isocyanurate foam insulation composed of a closed cell polyisocyanurate foam core laminated to a high performance coated glass facer. DensDeck, or equal – ½” Siliconized gypsum, fire-tested hardboard with glass-mat facers.

2.05 ATTACHMENT COMPONENTS

- A. Membrane Adhesive – as recommended by manufacturer

- B. B. Insulation Board Placement

1. A low odor, VOC compliant, one step, low-rise urethane foam used to attach insulation to approved compatible substrates. Adhesive is applied with a gravity fed applicator or by hand with a dual component caulk gun. Additional adhesive may be required for rougher surfaces. Consult Product Data Sheets for additional information.

Notes:

- a) Not recommended for use with insulation boards larger than 4x4 feet (1.2x1.2 m).
- b) Place insulation board into the adhesive shortly after it has reached its maximum rise [typically within 30 to 45 seconds at 60 to 80-degree F (16 to 27 degree C)] and walk into place.
- c) Minimum product temperature before entering the dispenser should be 70-degree F (21 degree C).
- d) Store between 60-degree F (16 degree C) and 80 degree F (27 degree C).
- e) Adhesive shall not be used during inclement weather.
- f) Adhesive shall not be applied to wet or damp surfaces.

2.06 DECK PRIMERS

- A. As recommended by manufacturer

2.07 WALKWAY PROTECTION

- A. As recommended by manufacturer

2.08 VAPOR BARRIER

- A. As recommended by manufacturer.

2.09 MISCELLANEOUS ACCESSORIES

- A. As recommended by manufacturer.

3.01 PRE-CONSTRUCTION CONFERENCE

- A. The Applicator, Owner's Representative/Designer and Manufacturer(s) shall attend a pre-construction conference.

The meeting shall discuss all aspects of the project including but not limited to:

1. Safety
2. Set up
3. Construction schedule
4. Contract conditions
5. Coordination of the work

3.02 SUBSTRATE CONDITION

- A. Applicator shall be responsible for acceptance or provision of proper substrate to receive new roofing materials.

- B. Applicator shall verify that the work done under related sections meets the following conditions:

1. ***Roof drains and scuppers have been reconditioned or replaced and installed properly.***
2. Roof curbs, nailers, equipment supports, vents and other roof penetrations are properly secured and prepared to receive new roofing materials.
3. All surfaces are smooth and free of dirt, debris and incompatible materials.
4. All roof surfaces shall be free of water, ice and snow.
5. Clearing and testing of all roof drains and leaders.

3.03 SUBSTRATE PREPARATION

- A. The roof deck and existing roof construction must be structurally sound to provide support for the new roof system. The Applicator shall load materials on the rooftop in such a manner as to eliminate risk of deck overload due to concentrated weight. The Owner's Representative shall ensure that the roof deck is secured to the structural framing according to local building code and in such a manner as to resist all anticipated wind loads in that location.

- B. Existing Poured Structural Concrete Deck:

The contractor shall provide a smooth and level finish and shall be free of dust, excess moisture, oil-based curing agents and loose debris. Sharp ridges or other projections above the surface shall be removed before roofing.

3.04 SUBSTRATE INSPECTION

- A. A dry, clean and smooth substrate shall be prepared to receive the Carlisle roof system.
- B. The Applicator shall inspect the substrate for defects such as excessive surface roughness, contamination, structural inadequacy, or any other condition that will

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adversely affect the quality of work.

- C. The substrate shall be clean, smooth, dry, free of flaws, sharp edges, loose and foreign material, oil and grease. Roofing shall not start until all defects have been corrected.
- D. All roof surfaces shall be free of water, ice and snow.

3.05 VAPOR BARRIER/AIR BARRIER INSTALLATION

- A. As recommended by manufacturer

3.07 INSULATION INSTALLATION

- A. General Criteria:

Insulation shall be installed according to insulation manufacturer's instructions.
General Criteria:

Insulation shall be neatly cut to fit around penetrations and projections.

Install tapered insulation in accordance with insulation manufacturer's shop drawings.

Install tapered insulation around drains creating a drain sump.

Use at least 2 layers of insulation when the total insulation thickness exceeds 2-1/2 inches (64 mm). Stagger joints at least 12 inches (0.3 m) between layers.

3.09 INSTALLATION OF MEMBRANE

- A. General – install to match existing roofing system.

3.10 MEMBRANE FLASHINGS

All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Owner's Representative and Carlisle representative. Approval shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing, the affected area shall be removed and replaced at the Applicator's expense. Flashing shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces. Use caution to ensure adhesive fumes are not drawn into the building.

3.11 METAL FLASHINGS

- A. Metal details, fabrication practices and installation methods shall conform to the applicable requirements of the following:
 1. Factory Mutual Loss Prevention Data Sheet 1-49 (latest issue).
 2. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - latest issue.
 3. Complete all metal work in conjunction with roofing and flashings so that a watertight condition exists daily.
 4. Metal shall be installed to provide adequate resistance to bending to allow for

normal thermal expansion and contraction.

5. Metal joints shall be watertight.
6. Metal flashings shall be securely fastened into solid wood blocking. Fasteners shall penetrate the wood nailer a minimum of 1 inch (25 mm).
7. Airtight and continuous metal hook strips are required behind metal fascias. Hook strips are to be fastened 12 inches (0.3 m) on center into the wood nailer or masonry wall.
8. Counter flashings shall overlap base flashings at least 4 inches (100 mm).
9. Hook strips shall extend past wood nailers over wall surfaces by 1-1/2-inch (38 mm) minimum and shall be securely sealed from air entry.

3.12 WALKWAY INSTALLATION

- A. Roofing membrane to receive Walkway shall be clean and dry. Install per manufacturer's recommendations.

3.13 TESTING

- A. Test to ensure all patching or revisions are in accordance with Carlisle Goldenseal Roofing System and to ensure the continuation of the existing warranty.

3.18 COMPLETION

- A. Prior to demobilization from the site, the work shall be reviewed by the Owner's Representative and the Applicator. All defects noted and non-compliances with the Specifications or the recommendations of Carlisle shall be itemized in a punch list. These items must be corrected immediately by the Applicator to the satisfaction of the Owner's Representative and Carlisle prior to demobilization.
- B. All Warranties referenced in this Specification shall have been submitted and have been accepted at time of contract award.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Flashings, counter flashings, seismic joint covers, vents, and copings as indicated on the Drawings and specified herein.
- B. Related Sections:
 - 1. Metal Fabrications; refer to Section 05 50 00.
 - 2. Refer to Division 7 for Roofing Sections
 - 3. Joint Sealants; refer to Section 07 92 00.
 - 5. Painting and Coating; refer to Section 09 90 00.
 - 6. Mechanical Equipment

1.02 REFERENCE STANDARDS

- A. Preform sheet metal work, including fabrications, in strict accordance with Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) Architectural Sheet Metal Manual, and the Aluminum Association.

1.03 SUBMITTALS

- A. Submit copies of standard details covering all sheet metal conditions and fabrications to be necessary on the project. Where standard details do not exist, prepare and deliver such details to Architect.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Fabricate sheet metal items from sheet steel in accordance with ASTM A653, galvanized in accordance with ASTM A653, G90. Galvanizing on exposed surfaces not receiving paint shall receive an appearance grade finish.
- B. Unless shown otherwise on Drawings, provide steel sheet metal of at least 22-gauge steel.
- C. Where sheet aluminum is shown on Drawings, provide 0.032-inch thickness (20 gauge) and in accordance with ASTM B209, for 3003-H14, in color finish as selected by Architect.
- D. Extruded Aluminum: Manufacturer's standard extrusions of sizes and profiles indicated, and in accordance with ASTM B221 for 6063-T52 alloy and temper, AA-C22A41 clear anodized finish; 0.080-inch minimum thickness for primary legs of extrusions that are anodized.
- E. Stainless Steel: AISI Type 302/304, complying with ASTM A167, with No. 2D soft

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annealed finish, except where harder temper required for forming or performance;
0.0187-inch (.05 mm) thick, except as otherwise indicated.

2.02 ACCESSORIES

- A. Fasteners and Clips: Provide as required and appropriate for the materials being fastened. Where fasteners or clips may be exposed to outside weather conditions, provide stainless steel type.
 - 1. Provide fasteners such as bolts, screws and nails hot dip galvanized as specified in accordance with ASTM A153.
- B. Where rivets will be used, provide malleable iron type with rust-inhibitive coating.
- C. If drive pins are incorporated into work, provide cadmium plated with neoprene facing, at least one-inch long, with neoprene washers.
- D. Solder: For use with steel or copper, provide 50 - 50 tin/lead solder (ASTM B32) with rosin flux.
- E. Solder: For use with stainless steel, provide 60 - 40 tin/lead solder (ASTM B32) with acid-chloride type flux, except use rosin flux over tinned surfaces.
- F. Bituminous Coating: Solvent-type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.
- G. Mastic Sealant: Polyisobutylene; non-hardening, non-skinning, non-drying, non-migrating sealant.
- H. Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator of components being sealed and complying with requirements for joint sealants as specified in Section 07 92 00 Joint Sealants.
- I. Epoxy Seam Sealer: Two-part noncorrosive metal seam cementing compound, recommended by metal manufacturer for exterior/interior non-moving joints including riveted joints.
- J. Adhesives: Type recommended by flashing sheet manufacturer for waterproof/weather-resistant seaming and adhesive application of flashing sheet metal.
- K. Paper Slip Sheet: 5 lbs. rosin-sized building paper.
- L. Polyethylene Underlayment: Minimum 6-mil carbonated polyethylene film resistant to decay when tested in accordance with ASTM E154.
- M. Reglets: Metal or plastic units of type and profile indicated, compatible with flashing indicated, noncorrosive.
- N. Conductor-Head Guards: 20 gage bronze or nonmagnetic stainless-steel mesh or fabricated units, with selvedge edges and noncorrosive fasteners. Select materials for compatibility with gutters and downspouts.
- O. Elastic Flashing Filler: Closed-cell polyethylene or other soft closed-cell material recommended by elastic flashing manufacturer as filler under flashing loops to ensure movement with minimum stress on flashing sheet.

2.03 FABRICATION

- A. General Metal Fabrication: Shop fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
- B. Seams: Fabricate non-moving seams in sheet metal with flat-lock seams. For metal other than aluminum, in edges to be seamed, form seams and solder. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.
- C. Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used or would not be sufficiently weather/waterproof, form expansion joints of intermeshing hooked flanges, not less than 1-inch-deep, filled with mastic sealant (concealed within joints).
- D. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.
- E. Separations: Provide for separation of metal from incompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.
- F. Aluminum Extrusion Units: Fabricate extruded aluminum running units with formed for extruded aluminum joint covers. Fabricate mitered and welded corner units.

2.04 PREFABRICATED COPINGS AND FLASHINGS

- A. Provide factory prefabricated 0.050" aluminum continuous snap-on type copings with concealed mounting plate at joints. Copings shall be maximum 10' lengths. Mounting plate shall be extended 5 inches minimum beyond space between coping lengths. Secure cover plate according to manufacturers' recommendations. Provide flashing manufactured by Fry Reglet or other as approved by Architect.
 - 1. Pre-finish coping in Kynar 500 coating of custom color as selected by Architect.
 - 2. Copings shall be Factory Mutual Class I-90 certified. Provide certification to Architect.
 - 3. Arched copings shall be factory pre-fabricated true-arch copings, CNC machine cut heli-arc welded and finish ground prior to Kynar 500 finish. Segmented copings shall not be accepted. Arched coping sections shall be fabricated from 0.063" aluminum and not exceed 5' in length."

PART 3 - EXECUTION

3.01 PREPARATION

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- A. Inspect substrate conditions prior to installation of sheet metal items. Conditions which could be detrimental to correct and proper installation of sheet metal assemblies are to be called to the attention of the Owner for their disposition prior to sheet metal work being installed.
- B. Coordinate fabrication and installation of sheet metal items with work of others such as roofing, curtainwall and windows, sealants, mechanical and electrical.
- C. Clearing and testing of all roof drains and leaders.

3.02 INSTALLATION

- A. General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations and with SMACNA "Architectural Sheet Metal Manual." Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weatherproof.
- B. Underlayment: Where stainless steel or aluminum is to be installed directly on cementitious or wood substrates, install a slip sheet of red rosin paper and a course of polyethylene underlayment.
- C. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.
- D. Install reglets to receive counterflashing in manner and by methods indicated. Where shown in concrete, furnish reglets to trades of concrete work for installation as work of Division 3 sections. Where shown in masonry, furnish reglets to trades of masonry work, for installation as work of Division 4 sections.
- E. Install counterflashings in reglets, either by snap-in seal arrangement or by welding in-place for anchorage and filling reglet with mastic or elastomeric sealant, as indicated in depending on degree of sealant exposure.
- F. Install elastic flashing in accordance with manufacture's recommendations. Where required, provide for movement as joints by forming loops or bellows in width of flashing. Locate cover or filler strips at joints to facilitate complete drainage of water for flashing. Seam adjacent flashing sheets with adhesive, seal and anchor edges in accordance with manufacturer's recommendations.
- G. Nail flanges of expansion joint units to curb nailers, at maximum spacing of 6 inches o.c. Fabricate seams at joints between units with minimum 3-inch overlap, to form a continuous, waterproof system.
- H. Conductor Head Guards: Install "bee-hive type" strainer-guard at conductor heads, removable for cleaning downspouts.
- I. Flash around exterior openings in the building where other waterproofing methods are insufficient.
- J. Flood Testing Drains: Flood test each drain for leaks, after completing roofing and flashing but before overlying construction is placed. Plug or dam drains, and flood with potable water.

1. Flood to an average depth of 1-1/2 inches not exceeding a depth of 2.5 inches.
 2. Flood each area for 24 hours.
 3. After flood testing, repair leaks, repeat flood tests, and make further repairs until roofing and flashing installations are watertight.
- K. Additional Testing: Set a sprinkler on the roof and run for approximately 1 hour, then move to a new section. Provide an observer below the roof substrate to identify any water intrusion.
1. After flood testing, if water intrusion is noted, repair leaks, repeat flood tests, and make further repairs until drain and flashing installations are watertight.

3.03 JOINTS

- A. Typically, provide flat locked joints with sealant between metal surfaces, unless shown otherwise. Where standing seams are required, provide with folded corners.
- B. Provide minimum of 1-inch laps.
- C. Where concealed joints are possible, provide flat locked joints with 3 inch reinforcing behind, set in full bed of sealant
- D. Do not leave sheet metal joint unsealed. See sealant section of these specifications.

3.04 INSPECTION

- A. Immediately following installation of sheet metal work, touch-up areas where primer has been removed during installation operations and where soldering has occurred.
- B. Where architectural coatings are provided, touch-up marred or abraded finishes with compatible coating which can be expected to provide the same serviceability as factory applied coatings.

3.05 CLEANING

- A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

3.06 PROTECTION

- A. Advise Contractor of required procedures for surveillance and protection of flashings and sheet metal work during construction to ensure that work will be without damage or deterioration other than natural weathering at time of Substantial Completion.

END OF SECTION

SECTION 07 84 13

PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work specified in this section.

1.02 DEFINITIONS

- A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in fire rated wall and floor assemblies.

1.03 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

- A. Only tested firestop systems shall be used in specific locations as follows:
 - 1. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
 - 2. Blank openings through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
 - 3. Openings and penetrations in fire-rated partitions or walls containing fire doors.
 - 4. Openings around structural members which penetrate floors or walls.

1.04 RELATED WORK OF OTHER SECTIONS

- A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - 1. Section 03 30 00 – Cast-In-Place Concrete
 - 2. Section 04 22 00 – Masonry work
 - 3. Section 07 92 00 – Joint Sealants
 - 4. Section 09 24 00 – Cement Plastering
 - 5. Section 09 29 00 – Gypsum Board
 - 6. Section 23 01 00 – HVAC General Provisions
 - 7. Section 23 07 00 – HVAC Insulation
 - 8. Section 10 44 00 – Fire Protection Specialties

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9. Section 22 01 00 – Plumbing General Provisions
10. Section 26 00 00 – General Electrical Requirements

1.05 REFERENCES

- A. Test Requirements: ASTM E814, "Standard Method of Fire Tests of Penetration Firestop Systems."
- B. Underwriters Laboratories (UL) of Northbrook, IL runs ASTM E814 under their designation of UL 1479 and publishes the results in their "FIRE RESISTANCE DIRECTORY" that is updated annually.
 1. UL Fire Resistance Directory:
 - a. Firestop Devices (XHJI)
 - b. Fire-Resistance Ratings (BXUV)
 - c. Through-Penetration Firestop Systems (XHEZ)
 - d. Fill, Voids, or Cavity Materials (XHHW)
 - e. Forming Materials (XHKU)
- C. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments
- D. ASTM E84, "Standard Test Method for Surface Burning Characteristics of Building Materials."
- E. Inspection Requirements: ASTM E2174, "Standard Practice for On-Site Inspection of Installed Fire Stops."
- F. All major building codes: ICC, SBCCI, BOCA, and IBC.
- G. NFPA 101 - Life Safety Code
- H. NFPA 70 - National Electric Code

1.06 QUALITY ASSURANCE

- A. A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.
- B. Firestop System installation must meet requirements of ASTM E814 or UL 1479 tested assemblies that provide a fire rating equal to that of construction being penetrated.
- C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.
- D. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.

- E. For those firestop applications that exist for which no UL tested system is available through a manufacturer, an engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council.

1.07 SUBMITTALS

- A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL firestop systems to be used and manufacturer's installation instructions to comply with Section 01 33 00.
- B. Manufacturer's engineering judgment identification number and drawing details when no UL system is available for an application. Engineer judgment must include both project name and contractor's name who will install firestop system as described in drawing.
- C. Submit material safety data sheets provided with product delivered to jobsite.

1.08 INSTALLER QUALIFICATIONS

- A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at jobsite.
- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- E. Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

- A. Do not use materials that contain flammable solvents.
- B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.
- C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

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- E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

PART 2 - PRODUCTS

2.01 FIRESTOPPING, GENERAL

- A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- C. Firestopping Materials are either “cast-in-place” (integral with concrete placement) or “post installed.” Provide cast-in-place firestop devices prior to concrete placement.

2.02 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with through penetration firestop systems (XHEZ) listed in Volume II of the UL Fire Resistance Directory, provide products of the following manufacturers as identified below:
 - 1. Hilti, Inc., Tulsa, Oklahoma, Phone: (800) 879-8000.
 - 2. Provide products from the above acceptable manufacturer; *no substitutions will be accepted.*

2.03 MATERIALS

- A. Use only firestop products that have been UL 1479 or ASTM E814 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- B. Cast-in place firestop devices for use with non-combustible and combustible plastic pipe (closed and open piping systems) penetrating concrete floors, the following products are acceptable:
 - 1. Hilti CP 680 Cast-In Place Firestop Device
- C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:
 - 1. Hilti FS-ONE Intumescent Firestop Sealant
 - 2. Hilti CP 604 Self-Leveling Firestop Sealant
 - 3. Hilti CP 620 Fire Foam
- D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:

1. Hilti CP 601S Elastomeric Firestop Sealant
 2. Hilti CP 606 Flexible Firestop Sealant
 3. Hilti FS-ONE Intumescent Firestop Sealant
 4. Hilti CP 604 Self-Leveling Firestop Sealant
- E. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:
1. Hilti FS-ONE Intumescent Firestop Sealant
- F. Foams, Intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:
1. Hilti FS-ONE Intumescent Firestop Sealant
 2. Hilti CP 618 Firestop Putty Stick
 3. Hilti CP 620 Fire Foam
- G. Non curing, re-penetrable intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:
1. Hilti CP 618 Firestop Putty Stick
- H. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:
1. Hilti CP 617 Firestop Putty Pad
- I. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:
1. Hilti CP 643 Firestop Collar
 2. Hilti CP 644 Firestop Collar
 3. Hilti CP 648 Wrap Strips
- J. Materials used for complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
1. Hilti CP 637 Firestop Mortar
 2. Hilti FS 657 Fire Blocks
 3. Hilti CP 620 Fire Foam

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- K. Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
 - 1. Hilti FS 657 Fire Blocks
- L. For blank openings made in fire-rated wall or floor assemblies, where future penetration of pipes, conduits, or cables is expected, the following products are acceptable:
 - 1. Hilti FS 657 Fire Blocks
- M. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - 1. Verify penetrations are properly sized and in suitable condition for application of materials.
 - 2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
 - 3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
 - 4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
 - 5. Do not proceed until unsatisfactory conditions have been corrected.

3.02 COORDINATION

- A. Coordinate location and proper selection of cast-in-place Firestop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.
- B. Responsible trade to provide adequate spacing of field run pipes to allow for installation of cast-in-place firestop devices without interferences.

3.03 INSTALLATION

- A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory.
- B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration materials.
 - 1. Seal all holes or voids made by penetrations to ensure an air and water-resistant seal.

2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
3. Protect materials from damage on surfaces subjected to traffic.

3.04 FIELD QUALITY CONTROL

- A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
- B. Keep areas of work accessible until inspection by applicable code authorities.
- C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, "Standard Practice for On-Site Inspection of Installed Fire Stops" or other recognized standard.
- D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

3.05 ADJUSTING AND CLEANING

- A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes joint sealants for the applications indicated in the Joint-Sealant Schedule at the end of Part 3.
- B. Related Sections include the following:
 - 1. Division 1 Section "LEED Requirements" for additional LEED requirements
 - 2. Division 9 Section "Gypsum Board Assemblies" for sealing perimeter joints of gypsum board partitions to reduce sound transmission.

1.03 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

1.04 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.05 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

1.06 PROJECT CONDITIONS

- B. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.

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4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.02 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Provide interior sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 1. Sealants: 250 g/L.
 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 3. Sealant Primers for Porous Substrates: 775 g/L.
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.03 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Single-Component Neutral- and Basic-Curing Silicone Sealant:
 1. Products:
 - a. GE Silicones; SilPruf LM SCS2700.
 - b. Tremco; Spectrem 1 (Basic).
 - c. GE Silicones; SilPruf SCS2000.
 - d. Sonneborn, Division of ChemRex Inc.; Omniseal.
 - e. Tremco; Spectrem 3.
 - f. Tremco; Spectrem 2
 2. Type and Grade: S (single component) and NS (nonsag).

3. Class: 50.
4. Use Related to Exposure: NT (nontraffic).
5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
6. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.

D. Single-Component Mildew-Resistant Neutral-Curing Silicone Sealant:

1. Products:
 - a. Pecora Corporation; 898.
 - b. Tremco; Tremsil 600 White.
2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Use Related to Exposure: NT (nontraffic).
5. Uses Related to Joint Substrates: To sensitive surface joint substrates indicated, O.
 - a. Use O Joint Substrates: Galvanized steel and insulated glazing units.

E. Single-Component Mildew-Resistant Acid-Curing Silicone Sealant:

1. Products:
 - a. Dow Corning Corporation; 786 Mildew Resistant.
 - b. GE Silicones; Sanitary SCS1700.
 - c. Tremco; Tremsil 200.
2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Use Related to Exposure: NT (nontraffic).
5. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.

2.04 URETHANE SEALANT

A. Multicomponent Pourable Urethane Sealant:

1. Products:
 - a. Pecora Corporation; Urexpan NR-200.
 - b. Schnee-Morehead, Inc.; Permathane SM 7201.
 - c. Tremco; THC-901.
 - d. Tremco; THC-900.
2. Type and Grade: M (multicomponent) and P (pourable).
3. Class: 25.
4. Use Related to Exposure: T (traffic).
5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.

B. Single-Component Nonsag Urethane Sealant:

1. Products:

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- a. Sika Corporation, Inc.; Sikaflex - 1a.
 - b. Sonneborn, Division of ChemRex Inc.; NP 1.
 - c. Tremco; Vulkem 116.
 - d. Tremco; DyMonic 100
2. Type and Grade: S (single component) and NS (nonsag).
 3. Class: 25.
 4. Uses Related to Exposure: T (traffic) and NT (nontraffic).
 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

2.05 LATEX JOINT SEALANTS

- A. Latex Sealant: Comply with ASTM C 834, Type P, Grade NF.
- B. Products:
 1. Pecora Corporation; AC-20+.
 2. Schnee-Morehead, Inc.; SM 8200.
 3. Sonneborn, Division of ChemRex Inc.; Sonolac.
 4. Tremco; Tremflex 834.

2.06 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F (minus 32 deg C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.07 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include, but are not limited to, the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include, but are not limited to, the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION OF JOINT SEALANTS

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- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
 - B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
 - C. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
 - D. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
 - E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
 - F. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
 - G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
- 3.04 CLEANING
- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
- 3.05 PROTECTION
- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage

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or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.06 SEALANT SCHEDULE

JOINT SEALANT	APPLICATION
Single and Multi-Component Neutral- and Basic-Curing Silicone Sealant	<ul style="list-style-type: none"> • Exterior perimeter joints at frames of doors, windows and louvers • Exterior control and expansion joints in ceilings and other overhead surfaces • Exterior vertical joints between different materials listed above • All other exterior vertical and horizontal nontraffic joints unless noted otherwise
Single-Component Mildew-Resistant Neutral-Curing Silicone Sealant	<ul style="list-style-type: none"> • Exterior joints with galvanized steel or insulated glass substrates
Single-Component Mildew-Resistant Acid-Curing Silicone Sealant	<ul style="list-style-type: none"> • Interior joints between plumbing fixtures and adjoining walls, floors, and counters • Joints between counters and adjoining walls and floors at bathrooms, kitchens and other wet areas
Multicomponent Pourable Urethane Sealant	<ul style="list-style-type: none"> • Exterior horizontal nontraffic and traffic isolation and contraction joints in cast-in-place concrete slabs
Single-Component Nonsag Urethane Sealant	<ul style="list-style-type: none"> • Interior perimeter joints of exterior openings
Latex Sealant	<ul style="list-style-type: none"> • Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances

END OF SECTION

08 00 00

OPENINGS

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SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes:

- 1. Interior standard steel doors and frames.
- 2. Exterior standard steel doors and frames.
- 3. Borrowed lites.
- 4. Hollow-metal panels.

B. Related Requirements:

- 1. Section 08 71 00 "Door Hardware" for door hardware for hollow-metal doors.
- 2. Section 08 80 00 "Glazing" for glazing installed in doors.
- 3. Section 09 90 00 "Painting and Coating".

1.03 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.04 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware.
- C. For Modernization projects, determine with District Project Manager if it is cost effective or even desirable to modify existing doors and/or frames. If so, edit paragraph below to suit Project.
- D. Existing Conditions: Field survey existing doors and frames that are part of the Work. For existing doors and frames to remain and to receive new door hardware, determine compatibility with hardware specified in Section 08 71 00 "Door Hardware." For existing

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door openings to receive a new door and/or frame, verify dimensions of door opening and frame depth.

1. Submit a list of respective door and frame measurements to the District Construction Manager for review prior to ordering doors and frames.
2. Notify the District Construction Manager of any doors and/or frames found to be unsuitable for reuse, or that will not accept specified door hardware.

1.05 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.06 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings and finishes.

- B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

- C. Samples for Verification:

1. Fabrication: Prepare Samples approximately 12 by 12 inches to demonstrate compliance with requirements for quality of materials and construction:
 - a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
 - b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.

- D. Product Schedule: For hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.07 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.
- B. Certification of Label Construction: For labeled doors, certificate from nationally recognized testing agency stating that component construction conforms to UL rating requirements for the label indicated.
- C. Certification of Rated Assembly: For rated assemblies, provide certificate from nationally recognized testing agency that doors provided have been tested for use in assemblies complying with NFPA 80 for fire-protection ratings indicated, based on testing at positive pressure according to UL 10C.
- D. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.
- E. Certification of Physical Endurance: For hollow metal doors, certificate from nationally recognized testing agency that doors comply with requirements of SDI 131-10.
- F. Qualification Data: For Manufacturer, Supplier, and Installer.

1.08 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A member of SDI that supplies doors and frames through a national distribution system. Manufacturers that market materials by a factory direct method are not acceptable.
- B. Supplier Qualifications: Supplier shall be a qualified direct distributor of the manufacturer's products. The Supplier shall have in its regular employment a person who is currently certified by DHI as an Architectural Hardware Consultant (AHC) or a Certified Door Consultant (CDC). The Supplier shall be available at reasonable times throughout the Project for consultation with Contractor, Architect, and District Construction Manager. The Supplier shall be available for in-person on-site consultation within 48 hours of first notice.
- C. Installer Qualifications: Firm with a minimum of five years' experience in the installation of hollow metal doors and frames similar to the type required for this Project.
- D. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.
- E. The District Construction Manager may select not more than two doors at random for dismantling and inspection of internal construction for compliance with Project Specifications. Provide doors, labor, and tools for inspection under the District Construction Manager's supervision, at Contractor's expense.
- F. Failure of any hollow metal frame or door to comply with specified requirements shall be grounds to reject the entire shipment of hollow metal doors and frames, as well as to reject the Manufacturer. Items shall be replaced at Contractor's expense, including two additional doors for dismantling and inspection. No extensions of time or additions to the Contract amount will be allowed due to a rejection of material and substitution of the hollow metal Manufacturer.

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1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use unvented plastic.
- B. Upon delivery to the site, inspect hollow-metal work for damage. Minor damage may be repaired provided refinished items are equal to new work and accepted by the District Construction Manager. Otherwise, remove and replace damaged items.
- C. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- D. Store hollow-metal work vertically under cover in a dry, secure location at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation. If cardboard containers become wet, remove containers and dry contents immediately.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to warrant products against defects in materials and workmanship.
 - 1. Warranty Period: One year from date of delivery.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Ceco Door; ASSA ABLOY.
 - 2. Curries Company; ASSA ABLOY.
 - 3. Steelcraft; an Allegion brand.
 - 4. Or Equal.

2.02 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
- B. Retain "Temperature-Rise Limit" Subparagraph below if required and coordinate with option in "Fire-Rated Assemblies" Paragraph above.
- C. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.03 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3.
 - 1. Physical Performance: SDI A250.4, Level A.
 - 2. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Metallic-coated, cold-rolled steel sheet, minimum thickness of 0.053 inch, with minimum A60 coating.
 - d. Edge Construction: Model 2, Seamless construction by continuous wire weld.
 - e. Core: Polystyrene.
 - f. Fire-Rated Core: Manufacturer's standard core for fire-rated, where indicated.
 - 3. Frames:
 - a. Materials: Metallic-coated, steel sheet, minimum thickness of 0.053 inch, with minimum A60 coating.
 - b. Frames: Fabricated from same thickness material as adjacent door frame.
 - c. Construction: Full profile welded.
 - 1) Welded frames shall be ground smooth flush with neatly mitered or butted material cuts. Re-prime welded areas.
 - 4. Exposed Finish: Prime and paint.

2.04 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors: SDI A250.8, Level 3.
 - 1. Physical Performance: SDI A250.4, Level A.
 - 2. Type: As indicated in the Door and Frame Schedule.
 - 3. Thickness: 1-3/4 inches
 - 4. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A60 coating.
 - 5. Edge Construction: Model 2, Seamless construction by continuous wire weld.
 - 6. Core: Polystyrene.
 - 7. Rated Core: Manufacturer's standard core for fire-rated doors
 - 8. Exposed Finish: Prime and paint.

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C. Maximum-Duty Frames:

1. Physical Performance: SDI A250.4, Level A.
2. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A60 coating.
3. Construction: Full profile welded. Welded frames shall be ground smooth flush with neatly mitered or butted material cuts. Re-prime welded areas.
4. Exposed Finish: Prime.

2.05 BORROWED LITES AND SPANDREL GLASS

- A. Provide Spandrel glass at existing door as noted on plans. One inch Insulating Glass Unit Spandrels, by Vitro Glass, or equal with opacifier applied to #3 surface of the glass lite. Low e coating, Solarban 70 shall be applied to the #2 surface. Both glass panels shall be 1/4" tempered glass. Compatibility of the volatiles into the airspace for both coatings must be certified by the manufacturer. Condensing on the low-e coating will cause degradation and void warranty. Color shall be black, foil backed.

2.06 FRAME ANCHORS

A. Jamb Anchors:

1. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
2. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042-inch-thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.188 inch thick.
3. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
4. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
5. Post installed Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor. Formed from same material as frames, minimum thickness of 0.051 inch. Provide 2 fasteners welded to the bottom of each jamb and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.

2.07 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Zcoating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- G. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- I. Glazing: Comply with requirements in Section 08 80 00 "Glazing."
- J. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.08 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
 - 1. Fire Door Cores: As required to provide fire-protection ratings indicated.
 - 2. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches. Both hinge edge and lock edge channels to be welded to each face sheet of door.
 - a. Door lock edge reinforcing shall be one-piece, full height 14 gage channel.

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- b. Door hinge edge reinforcing shall be one-piece full height 12 gage channel formed and tapped for hinges, or as required per hardware.
 3. Top Edge Closures: Close top edges of doors with flush closures of 16 gage steel welded to face sheets.
 4. Bottom Edge Closures: Close bottom edges of doors **where required for attachment of weather stripping** with end closures or channels of 16 gage steel welded to face sheets.
 5. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration. Close tops of exterior doors flush by the addition of 16 gage galvanized steel channel fillers sealed watertight.
 6. Astragals: Provide flat security type or 'Z' overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- C. Hollow-Metal Frames: Fabricate in one piece unless shipping or handling limitations dictate fabrication in sections. Where frames are fabricated in sections, minimize sections, and provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. **Sidelite** Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
 2. Welded frame units are to be delivered to job site as single units. Transoms, sidelights, and window walls which are oversized for transportation, shall be furnished with splices and assembled in the field.
 3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated. Screws are allowed only on the non-secure side and shall not be visible when viewing door lite frame face.
 4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be built into masonry or grouted in full.
 5. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
 6. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:
 - 1) Two anchors per jamb up to 60 inches high.
 - 2) Three anchors per jamb from 60 to 90 inches high.
 - 3) Four anchors per jamb from 90 to 120 inches high.
 - 4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 24 inches o.c. and as follows:

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- 1) Three anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.
 - 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
- c. Compression Type: Not less than two anchors in each frame.
- d. Post installed Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
7. Head Anchors: Two anchors per head for frames installed in metal-stud walls, and three or more anchors in frame widths exceeding 42 inches. Spot weld to each jamb and extend to structure where indicated on Drawings.
8. Head Struts: For frames not anchored to masonry or concrete construction, provide ceiling struts spot welded to jambs each side extending to building structure where indicated on Drawings.
9. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
- a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
10. Terminated Stops: Terminate stops 6 inches above finish floor with a 45-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.
- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with BHMA A156.115 for preparation of hollow-metal work for hardware. Provide minimum thickness hardware reinforcing for mortise or surface applied hardware as follows:
 - a. Hinge doors. 0.138 inch or equivalent number of threads on doors.
 - b. Hinge 0.180 inch on frames for mortise hinges.
 - c. Continuous hinges 0.108 inch full length.
 - d. Locks 0.108 inch or equivalent number of threads.
 - e. Panic Devices 0.108 inch.
 - f. Surface Closer 0.078 inch.
 - g. Hold Open Arm 0.108 inch.
 - h. Closer 0.078 inch channel type.
 3. Through-bolts (SNB) are not permitted.

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4. Do not include unnecessary cutouts in door faces not required by hardware template.
- F. Glazed Lites: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Window frame glass stops shall be a minimum 0.0516-inch steel and 5/8 inch in height. Exterior stops and countersunk flat-head screws to be galvanized.
 2. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
 3. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 4. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 5. Provide loose stops and moldings on inside of hollow-metal work.
 6. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
- G. Existing Construction:
1. Modify existing doors and frames indicated to receive new hardware and hardware reinforcements.
 2. Template existing frames indicated to receive new doors with lockset latchbolt aligned with existing frame strike.
 3. When new strikes are required in frames with inadequate dimensions, field cut existing strike jambs, remove the existing strikes, and weld strike reinforcement as required. Surface installation is prohibited.
 4. Fill, patch, sand, and repaint doors and frames as required by the removal of existing hardware and the installation of replacement hardware.
 5. Furnish fillers as required after removal of existing hardware.
 6. Modification of labeled doors and frames must be approved and certified by Warnock Hersey.

2.09 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.10 ACCESSORIES

- A. Louvers: Provide insert type louvers for interior doors, where indicated, which comply with SDI 111, with blades or baffles formed of 0.040-inch-thick, cold-rolled steel sheet set into 0.040-inch-thick steel frame. Louvers and frames to be prime coated.
1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
 2. Lightproof Louver: Stationary louvers constructed with baffles to prevent light from passing from one side to the other.
 3. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door

assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.

- B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- C. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.03 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with SDI A250.11.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and without damage to completed Work.
 - a. At fire-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.

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- c. Install frames with removable stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 3. Solidly pack mineral-fiber insulation inside frames.
 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 5. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 6. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
 7. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below.
1. Install hollow metal doors in frames using hardware specified in Section 08 71 00 "Door Hardware". Install securely without marking or defacing hardware or finish work. Protect hardware finishes with suitable protective covering until completion of building.
 2. Doors are to be expertly hung and shall fit snug against all stops. After hanging, make all adjustments and remove respective hardware for finish painting where required. Reinstall hardware after finish painting.
 3. Non-Fire-Rated Steel Doors:
 - a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
 - c. At Bottom of Door without Thresholds: 5/8 inch plus or minus 1/32 inch.
 - d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.
 4. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 5. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- D. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.
1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.04 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove dirt, grout, excess sealant, glazing compounds, mortar and other bonding material from hollow-metal work immediately after installation. Fill all dents and holes with metal filler and sand smooth and flush with adjacent surfaces. Reprime and paint to match finish. Clean and polish.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- E. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION

SECTION 08 31 13

ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Access door and frame units, fire-rated, in wall, and ceiling locations.
- B. Reference drawings for extent, location and size of each type of access door required.

1.02 RELATED SECTIONS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections apply to work of this section.
- B. Section 03 30 00 – Cast-In-Place Concrete: Openings in concrete.
- C. Section 04 22 00 – Concrete Unit Masonry: Openings in masonry.
- D. Division 7 – Thermal and Moisture Protection: Roof hatches.
- E. Division 9 – Finishes: Access tile in suspended or furred acoustic tile ceilings.
- F. Section 09 90 00 – Paints and Coatings: Field paint finish.
- G. Division 22 – Plumbing: Plumbing components requiring access.
- H. Division 23 – Heating, Ventilating and Air Conditioning: Mechanical components requiring access.
- I. Division 26 – Electrical: Electrical components requiring access.

1.03 REFERENCES

- A. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- B. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 REGULATORY REQUIREMENTS

- A. Comply with California Building Code

1.05 DESIGN REQUIREMENTS

- A. Fabricate floor access assemblies to support live load of 100 lb/sq ft with deflection not to exceed 1/240 of span.

1.06 SUBMITTALS

- A. See Section 01 33 00 – Submittal Procedures, for administrative requirements.

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- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Shop Drawings: Indicate exact position of all access door units. Obtain specific locations and sizes for required access doors from trades requiring access to concealed equipment and indicate on submittal schedule. Submit shop drawings for fabrication and installation of customized access doors and frames, including details of each frame type, elevations of door design types, anchorage and accessory items.
- D. Samples: Submit two access units, [3x5] inch minimum size illustrating frame configuration, anchors, panel face material, and factory primer color.
- E. Manufacturer's Installation Instructions: Indicate installation requirements and rough-in dimensions. Submit manufacturer's technical data and installation instructions for each type of access door assembly, including setting drawings, templates, instructions and directions for installation of anchorage devices. Including complete schedule, including types, general locations, sizes, wall and ceiling construction details, finishes, latching or locking provisions, and other data pertinent to installation.
- F. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units which may vary slightly from sizes indicated.
- G. Project Record Documents: Record actual locations of all access units.

1.07 REGULATORY REQUIREMENTS

- A. Conform to applicable code for fire rated access doors.
 - 1. Provide access doors of fire rating equivalent to the fire rated assembly in which they are to be installed. Provide access door assembly with panel door, frame, hinge, and latch from manufacturer listed in Under Writers Laboratories, Inc., "Building Materials Directory" for rating shown.
- B. Provide products listed and labeled by UL and/or ITS (Warnock Hersey) as suitable for the purpose specified and indicated. Provide UL label on each fire-rated access door.
- C. Provide certificate of compliance from authority having jurisdiction indicating approval of fire rated doors.

1.08 PROJECT CONDITIONS

- A. Coordinate the work with other work requiring access doors. Coordinate locations with other work, furnish inserts and anchoring devices which must be built into other work for installation of access doors. Coordinate delivery with other work to avoid delays.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Access Doors and Frames:
 - 1. Karp Associates, Inc.
 - 2. Milcor Inc: www.milcorinc.com.
 - 3. J.L. Industries.

2.02 ACCESS DOORS AND PANELS

- A. All Units: Factory fabricated, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assemblies units are to be installed in.

2.03 FABRICATION AND MATERIALS

- A. General: Furnish each access door assembly manufactured as an integral unit, complete with all parts and ready for installation.
- B. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.
- C. Frames: Fabricate from 16-gage steel.
 - 1. Fabricate frame with exposed flange nominal 1" wide around perimeter of frame for units installed in the following construction:
 - a. Exposed masonry.
 - b. Exposed concrete.
 - c. Drywall finish.
 - 2. For gypsum drywall or gypsum plaster, furnish perforated frames with drywall bead.
 - 3. For installation in masonry construction, furnish frames with adjustable metal masonry anchors.
 - 4. For full-bed plaster applications, furnish frames with galvanized expanded metal lath and exposed casing bead, welded to perimeter of frame.
- D. Flush Panel Doors: Fabricate from not less than 14-gage sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175 degrees. Finish with manufacturer's factory-applied prime paint.
 - 1. For fire-rated units, provide manufacturer's standard insulated flush panel/doors, with continuous piano hinge and self-closing mechanism.
- E. Recessed Panel Doors: Fabricate from not less than 18-gage sheet steel with face of panel formed to provide recess below surface of applied finish. Reinforce panel as required to prevent buckling. Finish with manufacturer's factory-applied prime paint.
 - 1. Furnish recessed panels for concealed installation in acoustic tile ceiling systems.
 - 2. Furnish recessed panels and frames with expanded metal lath for concealed installation in plaster.
- F. Locking Devices: Furnish flush, screwdriver-operated cam locks of number required to hold door in flush, smooth plane when closed.
 - 1. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

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PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings are correctly sized and located.

3.02 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings. Secure rigidly in place.
- C. Position units to provide convenient access to the concealed work requiring access.
- D. Adjust hardware and panels after installation for proper operation.
- E. Remove and replace panels or frames which are warped, bowed or otherwise damaged.
- F. Paint to match adjacent finishes, unless otherwise noted in plans.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Door Hardware.
2. Gate Hardware.
3. Power supplies for electric hardware.
4. Low energy door operators plus sensors and actuators.

B. Related Sections:

1. Section 06 20 00 – Finish Carpentry: Finish Hardware Installation
2. Section 07 92 00 – Joint Sealants: Exterior thresholds
3. Section 08 11 13 – Hollow Metal Doors and Frames.
4. Section 08 80 00 – Glazing.
5. Division 26 – Electrical.
6. Section 28 30 01 – Fire Detection and Alarm System.

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

1. Windows.
2. Cabinets, including open wall shelving and locks.
3. Signs, except where scheduled.
4. Toilet accessories, including grab bars.
5. Installation.
6. Rough hardware.
7. Conduit, junction boxes & wiring.

1.02 REFERENCES:

Use date of standard in effect as of Bid date.

- A. American National Standards Institute – ANSI/BHMA 156.18 – Materials and Finishes.
- B. ADA – Americans with Disabilities Act of 1990 as amended by the ADA Amendments Act of 2010.
- C. BHMA – Builders Hardware Manufacturers Association
- D. DHI – Door and Hardware Institute
- E. NFPA – National Fire Protection Association
 1. NFPA 80 – Fire Doors and Other Opening Protectives
 2. NFPA 105 – Smoke Door Assemblies and Other Opening Protectives
 3. NFPA 252 – Fire Tests of Door Assemblies

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- F. UL – Underwriters Laboratories
 - 1. UL10C – Positive Pressure Fire Tests of Door Assemblies.
 - 2. UL 305 – Panic Hardware
- G. WH – Warnock Hersey
- H. 2019 California Building Code
- I. SDI – Steel Door Institute
- J. WI – Woodwork Institute
- K. AWI – Architectural Woodwork Institute
- L. NAAMM – National Association of Architectural Metal Manufacturers

1.03 SUBMITTALS & SUBSTITUTIONS

- A. **SUBMITTALS:** Submit six copies of schedule per Section 01 33 00. Only submittals printed one sided will be accepted and reviewed. Organize vertically formatted schedule into “Hardware Sets” with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:
 - 1. Type, style, function, size, quantity and finish of hardware items.
 - 2. Use BHMA Finish codes per ANSI/BHMA A156.18.
 - 3. Name, part number and manufacturer of each item.
 - 4. Fastenings and other pertinent information.
 - 5. Location of hardware set coordinated with floor plans and door schedule.
 - 6. Explanation of abbreviations, symbols, and codes contained in schedule.
 - 7. Mounting locations for hardware.
 - 8. Door and frame sizes, materials and degrees of swing.
 - 9. List of manufacturers used and their nearest representative with address and phone number.
 - 10. Catalog cuts.
 - 11. Wiring and Riser Diagrams.
 - 12. Manufacturer’s technical data and installation instructions for electric hardware.
 - 13. Date of jobsite visit for renovation projects.
- B. Bid and submit manufacturer’s updated/improved item if scheduled item is discontinued.
- C. **Deviations:** Highlight, encircle or otherwise identify deviations from “Schedule of Finish Hardware” on submittal with notations clearly designating those portions as deviating from this section.

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- D. If discrepancy between drawings and scheduled material in this section, bid the more expensive of the two choices, note the discrepancy in the submittal and request direction from Architect for resolution.
- E. Substitutions per Division 1 – General Requirements, Specification Sections. Include product data and indicate benefit to the Project. Furnish operating samples on request.
- F. Items listed with no substitute manufacturers have been requested by Owner to meet existing standard.
- G. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, wiring diagrams, manufacturers' installation, adjustment and maintenance information, and supplier's final inspection report.

1.04 QUALITY ASSURANCE:

- A. Qualifications:
 - 1. Hardware supplier: direct factory contract supplier who employs a certified architectural hardware consultant (AHC), available at reasonable times during course of work for project hardware consultation to Owner, Architect and Contractor.
 - a) Responsible for detailing, scheduling and ordering of finish hardware. Detailing implies that the submitted schedule of hardware is correct and complete for the intended function and performance of the openings.
- B. Hardware: Free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges and closers) from one manufacturer.
- C. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.
- D. Exterior Classroom Exit Doors: Use classroom security function locksets with holdback feature.
- E. Fire-Rated Openings: NFPA 80 compliant. Hardware UL10C / California State Fire Marshal Standard 12-7-4 (positive pressure) compliant for given type/size opening and degree of label. Provide proper latching hardware, non-flaming door closers, approved-bearing hinges, and resilient seals. Coordinate with wood door section for required intumescent seals. Furnish openings complete.
- F. Note: scheduled resilient seals may exceed selected door manufacturer's requirements.
- G. See 2.6.G for added information regarding resilient and intumescent seals.
- H. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturers' instructions.
- I. Pre-Installation Meetings: Initiate and conduct with supplier, installer and related trades, coordinate materials and techniques, and sequence complex hardware items and systems installation. Include manufacturers' representatives of locks, panic hardware and door closers in the meetings. Convene prior to commencement of related work.

1.05 DELIVERY, STORAGE AND HANDLING:

- A. Delivery: coordinate delivery to appropriate locations (shop or field).

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1. Permanent keys and cores: secured delivery direct to District locksmith.
- B. Acceptance at Site: Items individually packaged in manufacturers' original containers, complete with proper fasteners and related pieces. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers.
- C. Storage: Provide securely locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, dust, excessive heat and cold, etc.

1.06 PROJECT CONDITIONS AND COORDINATION:

- A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to Architect's approval.
- B. Coordination: Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents. Furnish related trades with the following information:
 1. Location of embedded and attached items to concrete.
 2. Location of wall-mounted hardware, including wall stops.
 3. Location of finish floor materials and floor-mounted hardware.
 4. Locations for conduit and raceways as needed for electrical hardware items. Fire/life-safety system interfacing. Point-to-point wiring diagrams plus riser diagrams to related trades.
 5. Manufacturer templates to door and frame fabricators.
- C. Check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation.
- D. Prior to submittal, carefully inspect existing conditions to verify finish hardware required to complete Work, including sizes, quantities, existing hardware scheduled for re-use, and sill condition material. If conflict between the specified/scheduled hardware and existing conditions, submit request for direction from Architect. Include date of jobsite visit in the submittal.
 1. For renovation projects, submittals prepared without thorough jobsite visit by qualified hardware expert will be rejected as non-compliant.

1.07 WARRANTY:

- A. Part of respective manufacturers' regular terms of sale. Provide manufacturers' written warranties:
 - 1. Locksets: Five years
 - 2. Exit Devices: Three years mechanical
Two years electrical
 - 3. Closers: Ten years mechanical
Two years electrical
 - 4. Hinges: Life of the Installation
 - 5. Continuous Hinges Life of the Installation
 - 6. Other Hardware Two years

1.08 COMMISSIONING:

- A. Conduct these tests prior to request for certificate of substantial completion:
 - 1. With installer present, test door hardware operation with climate control system and stairwell pressurization system both at rest and while in full operation.
 - 2. With installer, access control contractor and electrical contractor present, test electrical hardware systems for satisfactory operation.
 - 3. With installer and electrical contractor present, test hardware interfaced with fire/life-safety system for proper operation and release.

1.09 REGULATORY REQUIREMENTS:

- A. All hardware for accessible doors shall meet the requirements of CBC Sections 1008.1.9.1, 11B-404, and 11B-309.4.
- B. Hand-activated door opening hardware, handles, pulls, latches, locks, and other operating devices on accessible doors shall have a shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist to operate. CBC Section 11B-309.4. Hardware shall be within 34" and 44" above the floor. CBC Section 11B-404.2.7.
- C. Adjust doors to open with not more than 5.0 lbs pressure to open at exterior doors and 5.0 lbs at interior doors. As allowed per California Building Code, Section 11B-404.2.9 and 1010.1.3, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15 lbs.
- D. Adjust door closer sweep periods so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door, per California Building Code Section 11B-404.2.9, Item 3.
- E. Smooth surfaces at bottom 10" of push sides of doors, facilitating push-open with wheelchair footrests, per California Building Code Section 11B-404.2.10.

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- F. Door opening clear width no less than 32", measured from face of frame stop, or edge of inactive leaf of pair of doors, to door face with door opened to 90 degrees. Hardware projection not a factor in clear width if located above 30" and the hardware projects no more than 4". California Building Code Section 11B-404.2.3 and 1010.1.1.
 - 1. Exception: doors not requiring full passage through the opening, that is, to spaces less than 24" in depth, may have the clear opening width reduced to 20". Example: shallow closets.
- G. Door opening clear height no less than 80" measured from top of sill to bottom of frame header stop. Projections into clear opening height not to exceed 4". California Building Code Sections 11B-404.2.3 and 1010.1.1.
- H. Thresholds: floor or landing no more than 1/2" below the top of the threshold of the doorway. Change in level between 1/4" and 1/2": beveled to slope no greater than 1:2 (50 percent slope). California Building Code Sections 11B-404.2.5 and 1010.1.7.
- I. Floor stops: Do not locate in path of travel. Locate no more than 4" from walls, per CBC 2019 Section 11B-204 and 11B-307.
- J. Pairs of doors: limit swing of one leaf to 90 degrees to protect persons reading wall-mounted tactile signage.
- K. Meet California Building Code Sections 11B-404.2.7, 11B-404.2.9, 1010.1.8 and 1010.1.9.
- L. Exit Devices:
 - 1. Panic hardware shall comply with CBC Section 1010.1.9.2. Panic hardware shall be so mounted (within 36" and 44" above finished floor as recommended) that the clear width of the exitway is not less than 32" measured between the face of the door and the opposite stop. CBC Section 11B-404.2.3 and Figure 11B-404.2.3.
 - 2. The unlatching force of panic hardware shall not exceed 5 lbs (22.2N), applied in the direction of travel. CBC Section 11B-309.4.
 - 3. Panic hardware shall not be provided with "Night Latch" (NL) function for any accessible doors or gates unless the following conditions are met:
 - a. Such hardware has a dogging feature
 - b. It is dogged during the time the facility is open
 - c. Such dogging operation is performed only by employees as their job function (non-public use)
- M. All classroom doors shall be lockable from the inside.

PART 2 – PRODUCTS

NOTE: ABSOLUTELY NO CONCEALED HARDWARE TO BE USED AT ANYTIME OR UNDER ANY CIRCUMSTANCES

2.01 MANUFACTURERS:

A. Listed acceptable alternate manufacturers: submit for review products with equivalent function and features of scheduled products.

ITEM:	MANUFACTURER:	ACCEPTABLE SUB:
Hinges	(IVE) Ives 3CB1	Bommer
Continuous Hinges	(IVE) Ives Aluminum Geared Series	Pemko
Pivots	DO NOT USE	
Floor Closers	DO NOT USE	
Key System	(SCH) Schlage Primus I/C	District Standard
Locks	(SCH) Schlage L9000, LV9000	District Standard
Exit Devices	(VON) Von Duprin 99	District Standard
Key-Removable Mullion	(VON) Von Duprin KR4954,KR9954	District Standard
Closers	(LCN) LCN 4041,4041XP	District Standard
Auto Flush Bolts	(IVE) Ives FB30,FB40,FB50,FB60	DCI
Coordinators	(IVE) Ives COR Series	DCI
Silencers	(IVE) Ives	Rockwood
Push & Pull Plates	(IVE) Ives	Rockwood
Kickplates	(IVE) Ives	Rockwood
Stops & Holders	(IVE) Ives	Rockwood
Overhead Stops	(GLY) Glynn-Johnson 80 & 100 Series	None available
Thresholds	(NGP) NGP	Zero
Seals & Bottoms	(NGP) NGP	Zero

2.02 HINGING METHODS:

A. Drawings typically depict doors at 90 degrees, doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening. Advise architect if 8-inch width is insufficient.

B. Conform to manufacturer’s published hinge selection standard for door dimensions, weight and frequency, and to hinge selection as scheduled. Where manufacturer’s standard exceeds the scheduled product, furnish the heavier of the two choices, notify Architect of deviation from scheduled hardware.

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- C. Conventional Hinges: Steel or stainless-steel pins and concealed bearings. Hinge open widths minimum, but of sufficient throw to permit maximum door swing. Use heavy-weight hinges at doors with panic hardware and high-use door openings.
- D. Continuous Hinges: Use at outswing exterior doors
 - 1. Geared-type aluminum.
 - a) Use wide-throw units where needed for maximum degree of swing, advise architect if commonly available hinges are insufficient.
 - 2. At masonry construction, coordinate with the anchoring and hollow metal supplier prior to frame installation, by placing a strip of insulation on the back of the hollow metal frame behind the rabbet section. When the frame is grouted in place, the backing will allow drilling and tapping without dulling or breaking the installer's bits.

2.03 LOCKSETS, LATCHSETS:

- A. Mortise Locksets and Latchsets: Shall be Schlage L9000 Series as scheduled.
 - 1. Chassis: cold-rolled steel, handing field-changeable without disassembly.
 - 2. Latchbolts: 3/4 inch throw stainless steel anti-friction type.
 - 3. Lever Trim: through-bolted, accessible design, cast lever or solid extruded bar type levers as scheduled. Filled hollow tube design unacceptable.
 - a) Spindles: security design independent breakaway. Breakage of outside lever does not allow access to inside lever's hubworks to gain wrongful entry.
 - b) Inside lever applied by screwless shank mounting – no exposed trim mount screws
 - c) Outside and inside trim thru bolted together and through the door
 - 4. Spring-loaded fusible link provides fail secure mode in case of fire.
 - 5. Universal lock case – 10 functions in one case.
 - 6. Floating mounting tabs automatically adjusts to fit a beveled door edge.
 - 7. Field reversible handing without opening lock case.
 - 8. External spring cages allow for simple trim retrofit.
 - 9. Lever rotation in both directions (up & down) for ease of use.
 - 10. At Vandlgard locks, locked lever freely rotates down while remaining securely locked. This feature prevents damage to internal lock components when subjected to excessive force. Use at exterior doors when fixed Vandal-Resistant trim (Ives VR900 Series) is not used.
 - 11. Furnish inside indicator at exterior classroom doors with "locked" display.
 - 12. Independent lever rotation.

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13. Furnish solid cylinder collars with wave springs. Wall of collar to cover rim of mortise cylinder.
14. Thumbturns: accessible design not requiring pinching or twisting motions to operate.
15. Strikes: 16 gage curved steel, bronze or brass with 1 inch deep box construction, lips of sufficient length to clear trim and protect clothing.
16. Scheduled Lock Series and Design: Schlage L and LV series, OMEGA design.
17. Certifications:
 - a) ANSI/BHMA A156.18, Grade 1 Operational, Grade 1 Security.
 - b) ASTM F1450.
18. Accepted substitutions: none

2.04 EXIT DEVICES / PANIC HARDWARE

- A. General features: Shall be Von Duprin 99-2 Series as scheduled.
 1. Independent lab-tested 1,000,000 cycles.
 2. Use 98 Series with stainless-steel finish at gates. All other openings use 99-2 Series.
 3. Push-through push-pad design. No exposed push-pad fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.
 4. 0.75-inch throw deadlocking latchbolts.
 5. End caps: impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
 6. Mount all panic devices with through-bolt fasteners. Absolutely no concealed hardware to be used, under any circumstances.
 7. No exposed screws to show through glass doors.
 8. Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.
 9. Releasable in normal operation with 15-lb. maximum operating force, and with 32 lb. maximum pressure under 250-lb. load to the door.
 10. Flush end cap design as opposed to typical "bottle-cap" design end cap.
 11. Exterior doors use XP-series devices: Static load force resistance of at least 2000 pounds.
 12. Where devices span over door lite frame and the face of the selected lite manufacturer's frame is raised from the face of the door, furnish panic hardware manufacturer's fitted shims or glass-bead kits at no additional cost to the project.
 13. Comply with CBC Section 1010.1.8.

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B. Specific features:

1. Non-Fire Rated Devices: cylinder dogging.
2. Lever Trim: breakaway type, forged brass or bronze escutcheon min .130" thickness, compression spring drive, match lockset lever design.
3. Vandal-Resistant Trim: Use Ives VR900 Series at exterior doors whenever possible.
4. Fire-Labeled Devices: UL label indicating "Fire Exit Hardware".
5. At Paired Openings: Use key-removable mullion with 2 rim panic devices, DO NOT use concealed vertical rod devices or surface vertical rod devices.
6. DO NOT use mortise panic (9975) devices.
7. Electrically Operated Devices: Single manufacturer source for electric latch retraction devices, electrically controlled trim, power transfers, power supplies, monitoring switches and controls.
8. Removable Mullions: Removable with single turn of building key. Securely reinstalled without need for key. Furnish storage brackets for securely stowing the mullion away from the door when removed.
9. Accepted substitutions: none

2.05 CLOSERS

A. Surface Closers: Shall be LCN 4041 and 4040XP Series.

1. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
2. Use 4041XP closers at all exterior and high-use door openings.
3. ISO 2000 certified. Units stamped with date-of-manufacture code.
4. Independent lab-tested 10,000,000 cycles.
5. Non-sized, non-handed, and adjustable. Place closer inside building, stairs, and rooms.
6. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
7. At 6/8 high door openings, modify closer mounting so that closer body does not interfere with 80" opening height.
8. Adjustable to open with not more than 5.0lbs pressure to open at exterior doors and 5.0lbs at interior doors. As allowed per California Building Code, Section 11B-309.4 and 11B-404.2.9, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15lbs.

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9. When provided, the sweep period of the closer shall be adjusted so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door.
 10. Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.
 11. Extra-duty arms (EDA and CUSH) at exterior and interior doors scheduled with parallel arm units.
 12. Generally, closers need to swing to maximum allowable degree of opening (180 degrees if possible).
 13. Generally, do not use closers with hold-open feature unless specifically approved by Facilities Engineering and Maintenance.
 14. Use through-bolt fasteners at all closers.
 15. Exterior door closers: tested to 100 hours of ASTM B117 salt spray test, furnish data on request.
 16. Exterior doors: seasonal adjustments not required for temperatures from 120 degrees F to -30 degrees F, furnish checking fluid data on request.
 17. Non-flaming fluid will not fuel door or floor covering fires.
 18. Pressure Relief Valves (PRV) not permitted.
 19. Supply Special Rust Inhibitor (SRI) at corrosive environments. This special corrosion resistant pretreatment, when added to the powder coat finish, gives the closer a tremendous advantage over a potentially corrosive environment.
 20. Accepted substitutions: none
- B. Low-Energy Door Operators: Shall be LCN 4600 Series. Comply with ANSI/BHMA A156.19 Electric power-open, hydraulically checked spring power closing. Modular construction. Finished metal cover. Field-adjustable opening force, opening speed, time-open, closing and latching speeds. Door reopens and timing cycle restores if system reactuated during closing cycle. Breakaway clutch protection from forced closing. Door, frame, motor and drive train protected by attenuated initiation of opening cycle.
1. Self-contained low-voltage power supply, terminal strip and sequencing for incorporation of hardwired electric hardware with system operation.
 2. Provide concealed on/off system switch at closer body mechanism.

2.06 OTHER HARDWARE

- A. Automatic Flush Bolts: Low operating force design.
- B. Overhead Stops: Glynn-Johnson 80 and 100 Series. Non-plastic mechanisms and finished metal end caps. Field-changeable stop-only functions. Use only where floor or wall stops are inadvisable. When used, use heavy-weight hinges or continuous hinges.
- C. Kick Plates: Rounded and relieved edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.

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- D. Vandal-Resistant Trim: Use IVES VR900 Series at all exterior doors whenever possible.
- E. Lockguards: Use at exterior outswing single doors with lockset to protect gap between door and frame at strike when Vandal-Resistant trim is not used.
- F. Viewers: Provide 190-degree viewer at all exterior doors without visionlites. Install at wheelchair use eye level.
- G. Door Stops: Provide stops to protect walls, casework or other hardware.
 - 1. Unless otherwise noted in Hardware Sets, provide wall type with appropriate fasteners. Where wall type cannot be used, provide floor type. If neither can be used, provide overhead type.
 - 2. Locate overhead stops for maximum possible opening. Consult with Owner for furniture locations. Minimum: 90 deg stop / 95 deg deadstop. Note degree of opening in submittal.
- H. Seals: Finished to match adjacent frame color. Resilient seal material: polyurethane, polypropylene, nylon brush, silicone rubber or solid high-grade neoprene as scheduled. Do not furnish vinyl seal material. UL label applied to seals on rated doors. Substitute products: certify that the products equal or exceed specified material's thickness and durability.
 - 1. Proposed substitutions: submit for approval.
 - 2. Solid neoprene: MIL Spec. R6855-CL III, Grade 40.
 - 3. Non-corroding fasteners at in-swinging exterior doors.
 - 4. Fire-rated Doors, Resilient Seals: UL 263 / CBC Section 703 compliant. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements. Where rigid housed resilient seals are scheduled in this section and the selected door manufacturer only requires an adhesive-mounted resilient seal, furnish rigid housed seal. Adhesive applied seals are not allowed.
 - 5. Fire-rated Doors, Intumescent Seals: Furnished by selected door manufacturer. Furnish fire-labeled opening assembly complete and in full compliance with UL 263 / CBC Section 703. Where required, intumescent seals vary in requirement by door type and door manufacture -- careful coordination required
- I. Thresholds: As scheduled and per details. Comply with CBC Section 11B-404.2.5. Substitute products: certify that the products equal or exceed specified material's thickness. Proposed substitutions: submit for approval.
 - 1. Exteriors: Seal perimeter to exclude water and vermin. Use sealant complying with requirements in Division 07 "Thermal and Moisture Protection". Non-ferrous 1/4inch fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors (SS/FHSL).
 - 2. Fire-rated openings, 90min or less duration: use thresholds to interrupt floor covering material under the door where that material has a critical radiant flux value less than 0.22 watts per square centimeter, per NFPA 253. Use threshold unit as scheduled. If none scheduled, request direction from Architect.

3. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.
 4. Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full thread. Sleeve nuts: full length to prevent door compression.
- J. Exposed Through-Bolts: Use for fastening all closers and panic hardware. Coordinate with wood doors; ensure provision of proper blocking to ensure through-bolts will not crush or deform door for mounting panic hardware and door closers. Coordinate with metal doors and frames; ensure provision of proper reinforcement to ensure through-bolts will not crush or deform door for mounting panic hardware and door closers.
- K. Silencers: Interior hollow metal frames, 3 for single doors, 2 for pairs of doors. Omit where adhesive mounted seal occurs. Leave no unfilled/uncovered pre-punched silencer holes.
- L. Wall- & Floor-mounted electromagnetic door holders: LCN's SEM series or approved equivalent. Incorporate into U.L. listed fire & life-safety system, doors release to allow closure and latching when door's zone is in alarm state. Use minimum projection required to allow door to open as widely as allowed by wall conditions and projection of door hardware.

2.07 FINISH:

- A. Generally, BHMA 626 Satin Chromium OR BHMA 630 Satin Stainless Steel. Generally, use stainless steel finish only at gate openings.
1. Areas using BHMA 626 to have push-plates, pulls and protection plates of BHMA 630, Satin Stainless Steel, unless otherwise noted.
- B. Door closers: factory powder coated to match other hardware, unless otherwise noted.
- C. Aluminum items: match predominant adjacent material. Seals to coordinate with frame color.

2.08 KEYING REQUIREMENTS:

- A. Key System: Schlage Everest Primus high-security utility-patented keyway, interchangeable core throughout. Utility patent protection to extend at least until 2014. Key blanks available only from factory-direct sources, not available from after-market keyblank manufacturers. For estimate use factory GMK charge. Initiate and conduct meeting(s) with Owner and I-R Security & Safety Consultants representatives to determine system keyway(s), keybow styles, structure, degree of physical security and degree of geographic exclusivity. Furnish Owner's written approval of the system. Contractor will order and supply permanent cylinders (cores) and Owner will install cylinders (cores).
1. Existing factory-registered master key system.
 2. Primus Level 9G (verify)
 3. Construction keying: furnish temporary keyed-alike brass cores. Remove at substantial completion and install permanent cylinders/cores in Owner's presence. Demonstrate that construction key no longer operates.

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4. Temporary cylinders/cores remain supplier's property.
 5. Furnish 10 construction keys.
 6. Furnish 2 construction control keys.
 7. Furnish 200 keyblanks and 10 control keyblanks.
 8. Key Cylinders: furnish 6-pin solid brass construction.
 9. Furnish 20 extra "0" bitted cores.
- B. Cylinders/cores: keyed at by Owner, O bitted from factory of lock manufacturer where permanent records are maintained. Locksets and cylinders same manufacturer.
- C. Permanent keys: use secured shipment direct from point of origination to District locksmith.
1. 4 keys per cylinder, 3 control keyblanks, 200 additional keyblanks.
- D. Bitting List: use secured shipment direct from point of origination to District locksmith at completion.
- E. Approved Finish Hardware Submittal: furnish 2 copies to District locksmith at completion.

PART 3 - EXECUTION

3.01 ACCEPTABLE INSTALLERS:

- A. Can read and understand manufacturers' templates, suppliers' hardware schedules and printed installation instructions. Can readily distinguish drywall screws from manufacturers' furnished fasteners. Available to meet with manufacturers' representatives and related trades to discuss installation of hardware.

3.02 PREPARATION:

- A. Ensure that walls and frames are square and plumb before hardware installation. Make corrections before commencing hardware installation.
- B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.
1. Notify Architect of code conflicts before ordering material.
 2. Locate levers, key cylinders, t-turn pieces, touchbars and other operable portions of latching hardware between 34 inches to 44 inches above the finished floor, per CBC Sections 11B-404.27 and 11B-309.4.
 3. Where new hardware is to be installed near existing doors/hardware scheduled to remain, match locations of existing hardware.
- C. Overhead stops: before installing, determine proposed locations of furniture items, fixtures, and other items to be protected by the overhead stop's action.
- D. Existing frames and doors to be retrofitted with new hardware:

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1. Field-verify conditions and dimensions prior to ordering hardware. Fill existing hardware cut outs not being reused by the new hardware. Remove existing hardware not being reused, return to Owner unless directed otherwise.
2. Remove existing floor closers not scheduled for reuse, fill cavities with concrete and finish smooth
3. Cut and weld existing steel frames currently prepared with 2-3/4" height strikes. Cut an approx. 8" section from the strike jamb and weld in a reinforced section to accommodate specified hardware's strike.
4. Patch and weld flush filler pieces into existing door hardware preparations in steel doors and frames, leave surfaces smooth.
5. Glue in solid wood block fillers to fill cut outs in existing wood doors, sand surfaces smooth. Alternatively, use an approved epoxy-based wood filler product, submit product data for approval.

3.03 INSTALLATION

- A. Install hardware per manufacturer's instructions and recommendations. Do not install surface-mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation. Remove and reinstall or replace work deemed defective by Architect.
 1. Gaskets: install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through these seals. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.
 2. When hardware is to be attached to existing metal surface and insufficient reinforcement exists, use RivNuts, NutSerts or similar anchoring device for screws.
 3. Use manufacturers' fasteners furnished with hardware items or submit Request for Substitution with Architect.
 4. Replace fasteners damaged by power-driven tools.
- B. Locate floor stops no more that 4 inches from walls and not within paths of travel. See paragraph 2.2 regarding hinge widths, door should be well clear of point of wall reveal. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact Architect for direction.
- C. Core concrete for exterior door stop anchors. Set anchors in approved non-shrink grout.
- D. Locate overhead stops for minimum 90 degrees and maximum allowable degree of swing.
- E. Drill pilot holes for fasteners in wood doors and/or frames.
- F. Lubricate and adjust existing hardware scheduled to remain. Carefully remove and give to Owner items not scheduled for reuse.

3.04 REMODEL OR REPAIR TO EXISTING FACILITY

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- A. Field verify existing conditions and measurements prior to ordering hardware. Fill existing hardware cut outs not being used by the new hardware. Remove existing hardware not being reused.
- B. Disable or remove existing floor closers where they exist. If disabled cut or remove spindle.
- C. Where existing wall conditions will not allow door to swing using the scheduled hinges, provide wide-throw hinges and if needed extended arms on closers.
- D. Provide proper brackets to accommodate the mounting of closers on doors with flush transoms.

3.05 ADJUSTING

- A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.
 - 1. Hardware damaged by improper installation or adjustment methods: repair or replace to Owner's satisfaction.
 - 2. Adjust doors to fully latch with no more than 1 pound of pressure.
 - 3. Adjust delayed-action closers on fire-rated doors to fully close from fully-opened position in no more than 10 seconds.
 - 4. Adjust door closers per 1.9 this section.
- B. Inspection: Use hardware supplier's consultant or consultant's agent. Include supplier's report with closeout documents.
- C. Final inspection: Installer to provide letter to Owner that upon completion installer has visited the Project and has accomplished the following:
 - 1. Re-adjust hardware.
 - 2. Evaluate maintenance procedures and recommend changes or additions, and instruct Owner's personnel.
 - 3. Identify items that have deteriorated or failed.
 - 4. Submit written report identifying problems

3.06 DEMONSTRATION:

- A. Demonstrate mechanical hardware and electrical hardware systems, including adjustment and maintenance procedures.

3.07 PROTECTION/CLEANING:

- A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.
- B. Clean adjacent wall, frame and door surfaces soiled from installation/reinstallation process.

3.08 SCHEDULE OF FINISH HARDWARE

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- A. See door schedule in drawings for hardware set assignments.
- B. Manufacturers and their abbreviations used in this schedule

- GLY Glynn-Johnson
- IVE H.B. Ives
- LCN LCN Closers
- NGP National Guard Products
- SCH Schlage Lock Company
- VON Von Duprin

SPECWORKS # 90205

HW SET: 001 TYPICAL EXTERIOR CLASSROOM X LOCK

3	EA	HINGE	5BBI	628	IVE
1	EA	HOLDBACK LOCK	L9077T OME X 09-611 XL11-986 X LESS OUTSIDE TRIM	626	SCH
2	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR900	630	IVE
1	EA	SURFACE CLOSER	4040XP EDA X TB	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	FLOOR STOP	FS448 X MS(EXPANSION SHIELD & TAMPIN)	626	IVE
1	SET	SEALS	170SA	AL	NGP
1	EA	DOOR BOTTOM	12V	AL	NGP
1	EA	DOOR SWEEP	200NA	AL	NGP
1	EA	THRESHOLD	THRESHOLD PER DETAIL	AL	NGP
1	EA	VIEWER	698	626	IVE

LOCKSET HAS INSIDE INDICATOR "LOCKED"

HW SET: 002 TYPICAL EXTERIOR CLASSROOM X PANIC

3	EA	CONTINUOUS HINGE	5BBI	628	IVE
1	EA	PANIC HARDWARE	CDXP99 PA-AX X 628	626	VON
1	EA	RIM CYLINDER	20-057-ICX	626	SCH
1	EA	MORTISE CYLINDER	20-061-ICX FOR DOGGING	626	SCH
2	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR910NL	630	IVE
1	EA	SURFACE CLOSER	4040XP EDA X TB	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	FLOOR STOP	FS448 X MS(EXPANSION SHIELD & TAMPIN)	626	IVE
1	SET	SEALS	170SA	AL	NGP
1	EA	DOOR BOTTOM	12V	AL	NGP
1	EA	DOOR SWEEP	200NA	AL	NGP
1	EA	THRESHOLD	THRESHOLD PER DETAIL	AL	NGP
1	EA	VIEWER	698	626	IVE
1	EA	OVERHEAD STOP	100S-ADJ AS REQUIRED	630	GLY

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HW SET: 003 TYPICAL EXTERIOR PANIC – EXISTING DOORS

2	EA	PANIC HARDWARE	CDXP99EO X SNB	626	VON
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HW SET: 004 TYPICAL EXTERIOR HALL X PANIC

Provide each PR door(s) with the following:

2	EA	CONTINUOUS HINGE	112HD	628	IVE
1	EA	REMOVABLE MULLION	KR4954 STAB	689	VON
1	EA	PANIC HARDWARE	CD-PA-AX-98-NL-OP-110MD	626	VON
1	EA	MULLION STORAGE KIT	MT54	689	VON
1	EA	SFIC CYLINDER	C953-7CCA	626	FAL
1	EA	MORTISE CYLINDER	C987-7CCA 5622-IC	626	FAL
2	EA	SFIC CORE	CB807 SFIC	626	FAL
1	EA	DOOR PULL	VR910 NL	US32D	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	PA MOUNTING PLATE	4040XP-18PA SRI	689	LCN
2	EA	DOOR SWEEP	8193AA	AA	ZER
2	EA	MULLION SEAL	8780NBK PSA	BK	ZER
1	EA	THRESHOLD	525A-223	A	ZER
2	EA	SILENCER	SR64	GRY	IVE

HW SET: 005 EXTERIOR DOOR NEAR STAGE

1	EA	CONTINUOUS HINGE	700CS	630	IVE
1	EA	PANIC HARDWARE	AXCDSI99NL-OP PA	626	VON
1	EA	RIM CYLINDER	MATCH SITE STANDARD	626	
1	EA	MORTISE CYLINDER	MATCH SITE STANDARD (FOR DOGGING)	626	
1	EA	DOOR PULL	VR910NL	630	IVE
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	ARMOR PLATE	8400 36" X 2" LDW	630	IVE
1	EA	STOP/HOLDER	WS45 OR FS40 SERIES AS REQUIRED	626	IVE
1	SET	SEALS	706EA	AL	NGP
1	EA	DRIP CAP	16A (OMIT WHERE OVERHANG OCCURS)	AL	NGP
1	EA	DOOR SWEEP	C627A	AL	NGP
1	EA	THRESHOLD	AS DETAILED	AL	NGP
2	EA	ALARM CONTACT	7764	628	SCE

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HW SET: 006 DOOR AT FOOD SERVICE

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	LHB CLASSROOM LOCK	150(L/OST) X INSIDE INDICATOR "LOCKED"	626	SCH
1	EA	MORT. CYLINDER	MATCH SITE STANDARD	626	
1	EA	DOOR PULL	VR900	630	IVE
1	EA	ARMOR PLATE	8400 36" X 2" LDW	630	IVE
1	EA	STOP/HOLDER	WS45 OR FS40 SERIES AS REQUIRED	626	IVE
1	EA	SEALS	760EA	AL	NGP
1	EA	DOOR SWEEP	C627A	AL	NGP
1	EA	THRESHOLD		AL	NGP
1	EA	FIRE EXIT HARDWARE	AX99L-F 996L PA	626	VON

HW SET: 007 TYPICAL EXISTING DOOR - REFER TO PLAN FOR PANIC HARDWARE REPLACEMENT

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	626	VON
1	EA	2 CYL STOREROOM	L9466L 03N X INSIDE	626	SCH
2	EA	MORTISE CYLINDER	MATCH SITE STANDARD	626	
1	EA	SURFACE CLOSER	4041 HEDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	STOP	WS406CVX OR FS436/435 AS REQUIRED	630	IVE
1	SET	SEALS	5020B	BRN	NGP

HW SET: 008 TYPICAL DOOR AT HALLWAY X PANIC HARDWARE

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PUSH PLATE	8200 8" X 16"	630	IVE
1	EA	PULL PLATE	8302-0 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4041 DEL	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	STOP	WS406CVX OR FS436/435 AS REQUIRED	630	IVE

HW SET: 009 BUILDING A

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	2 CYL STOREROOM	L9466L 03N X INSIDE INDICATOR "LOCKED"	626	SCH
1	EA	MORT. CYLINDER	MATCH SITE STANDARD	626	
1	EA	SURFACE CLOSER	4041 HEDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	STOP	WS406CVX OR FS436/435 AS REQUIRED	630	IVE
1	SET	SEALS	5020B	BRN	NGP

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Exterior and interior glass and glazing, including glazing clips, channels, compound and glazing beads, unless furnished with frame to be glazed as indicated on the Drawings and specified herein.
- B. Related Sections:
 - 1. Section 07 92 00 – Joint Sealants.
 - 2. Section 08 11 13 – Hollow metal Door Frames.

1.02 REFERENCE STANDARDS

- A. ASTM C920 – Standard Specification for Elastomeric Joint Sealants (Sealing Compound, Synthetic Rubber base, Single Component, Chemical Curing for Caulking, Sealing and Glazing in Building Construction).
- B. AAMA 800 and AAMA 807.3 - Non-skinning Resilient Preformed Compounds - Tapes, Ribbons, Beads with Release Paper.
- C. ANSI Z97.1
- D. GANA – Glass Association of North America
- E. 16 CFR 1201
- F. Chapter 24, Part 2, Title 24, California Building Code, 2019.
- G. NFPA 80

1.03 SUBMITTALS

- A. Prepare and submit a schedule of glazing components.
 - 1. Schedule tapes, gaskets, separators and related items including the designation of areas and specific locations where materials and products are to be used, special instructions on their use and installation, and show scheduled items on shop drawings.
 - 2. Provide detailed instructions for the installation and reglazing of glass units. Include with instructions and explanatory details, the sequence of installation, method of installation for materials and products including the glass, glazing gaskets, setting blocks, jamb blocks, etc., location of specific items such as the setting blocks and jamb blocks and special instructions as may be required.
- D. Certifications:
 - 1. Certify that the following materials and products and processes conform to these

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Contract Documents and submit in accordance with other sections of these specifications:

- a. Sealants
- b. Neoprene, nylon, etc.
- c. Compatibility of materials, finishes, methods of application.

1.04 QUALITY ASSURANCE

A. Glass Performance:

1. The maximum overall size, minimum thickness, and type of glass is to conform to the applicable glass manufacturer's published recommendations for the openings or sizes indicated on the drawings, and the performance requirements specified in these specifications.
2. Ensure that glass and glazing components conform to governing codes and regulations.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Take reasonable precautions necessary to provide complete protection of glass and glazing materials before, during and after installation.
- B. In event of damages or breakage, repair or replace damaged and defective materials and products to the satisfaction of the Owner within five (5) calendar days.

1.06 GUARANTEE

- A. Furnish written guarantee covering work of this Section for 5 years from date of substantial completion. Under the terms of this guarantee, failures shall be repaired or replaced to satisfaction of the Architect and Owner without additional cost to the Owner. Under the guarantee, failures except vandalism and malicious mischief shall be repaired at no additional cost to Owner.

PART 2 - PRODUCTS

2.01 GLAZING

A. Sealants:

3. Tremco, General Electric, and Dow Corning sealant products are approved where use is documented and in accordance with the use and conditions of this project.
4. Compatibility and sequence of installation for sealants is to be carefully considered in design to ensure that required cure and optimum performance are met.
5. Do not use sealants that degrade or fail under design conditions including, thermal movement (expansion and contraction), sanding water, ultra-violet exposure, aging, and other adverse time and environmental conditions.

6. Structural Sealants: Provide Tremco, "Spectrum II", G.E. or Dow Corning "745", or equal, approved sealant and Dow Corning "1200 RTC4V" primer or equal. Ensure acceptance by manufacturer of product or system of construction into which glass and sealant is being installed.
 4. Color: To be selected by Architect.
 5. Test sealants in accordance with ASTM C794.
 6. Perform field adhesion tests in accordance with manufacturer's printed recommendations.
 7. Glazing Putty: NFPA-80, paintable.
- B. Spacers: Provide extruded silicone shims, 60-70 Type A Durometer.
- C. Setting Blocks: Provide neoprene 80 to 90 Type A Durometer hardness type.
- D. Tape: Provide Tremco 440 tape, or other approved.
- E. Neoprene Glazing Gaskets and Air Seals:
1. Provide glazing gaskets which are extruded type with continuous interlocking projection to engage into the metal glass holding member, are designed to be in contact at times with adjacent contiguous elements during dynamic loading, building and thermal movements, and provide a continuous water tight seal as required to meet the performance criteria.
 2. Roll-in and back-up gaskets are to be sized in lengths or units to provide for a minimum crowd-in of one percent to two percent, or as otherwise recommended by manufacturer, to ensure against pullback at corners.
 3. Roll-in glazing and back-up gaskets for one lite or glazed opening is to be continuous one-piece units with factory fabricated injection molded corners free of flashing and burrs.
 4. Materials, recommendations and details describing the proposed use, design, and application procedures for glass and glazing materials are to be documented and fully described on shop drawings.
 5. Air seal gaskets are to be continuous, closed cell (sponge) neoprene gaskets with pressure sensitive adhesive on one side in thickness and shore Durometer hardness as required for the specified performance criteria.
- F. Provide compound for fire-rated materials in strict accordance with manufacturer's instructions.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Remove lacquer and other coatings from glazing rabbets. Thoroughly clean areas to receive glass and glazing materials. The installation shall be in strict accordance with

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recommendations of window, glass and sealant manufacturers. Glass shall be installed so that no metal-to-glass contact occurs.

- B. Installation shall be in accordance with applicable requirements of the latest edition of the "Glazing Manual" of the Flat Glass Marketing Association. Where vinyl or neoprene glazing beads or channels are used, they shall be in one piece for each edge of glass, with corners neatly mitered and tightly fitted together.
- C. Before the shop or field pre-glazing of the curtainwall units, openings will be checked to see that they are square, plumb and in true plane. If found otherwise, glazing will not proceed until proper corrections are made.
- D. Perimeter clearance must be sufficient to avoid point loading and provide for jamb and seismic blocking.

3.04 FIELD QUALITY CONTROL

- A. Testing: Upon completion of installation of glazing, perform water tests in accordance with industry standards for such tests, and ASTM E331, AAMA FC-1, and NAAMM. Repair leaks and re-test. Continue with tests and repairs or replacements until such time as entire installation has been tested and certifiably exhibits no water intrusion, thereby instituting five-year guarantee against such water intrusion.

3.05 CLEANING

- A. Immediately prior to scheduled acceptance of work, remove protective materials and clean glass members, being careful not to use abrasive or harmful cleaning agents.

3.06 PROTECTION

- A. Maintain glass in a reasonable clean condition during construction so that it will not be damaged by corrosive action and will not contribute (by wash-off) to the deterioration of glazing materials and other surfaces.

END OF SECTION

09 00 00

FINISHES

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SECTION 09 24 00
CEMENT PLASTERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Reference: Spec 09 90 00 Painting.

1.2 SUMMARY

- A. Section Includes:
 - 1. Exterior vertical plasterwork (stucco).
 - 2. Exterior horizontal and nonvertical plasterwork (stucco).
 - 3. Interior vertical plasterwork.
 - 4. Interior horizontal and nonvertical plasterwork.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover, and keep them dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.5 FIELD CONDITIONS

- A. Comply with ASTM C 926 requirements.
- B. Exterior Plasterwork:
 - 1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
 - 2. Apply plaster when ambient temperature is greater than 40 deg F.

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3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.
- C. Interior Plasterwork: Maintain room temperatures at greater than 40 deg F for at least 48 hours before plaster application, and continuously during and after application.
1. Avoid conditions that result in plaster drying out during curing period. Distribute heat evenly; prevent concentrated or uneven heat on plaster.
 2. Ventilate building spaces as required to remove water in excess of that required for hydrating plaster in a manner that prevents drafts of air from contacting surfaces during plaster application and until plaster is dry.
- D. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.1 METAL LATH

- A. Wire-Fabric Lath:
1. Welded-Wire Lath: ASTM C 933; self-furring, 1.95 lb/sq. yd..
 2. Woven-Wire Lath: ASTM C 1032; self-furring, with stiffener wire backing, 1.4 lb/sq. yd..
- B. Paper Backing: FS UU-B-790a, Type I, Grade D, Style 2 vapor-permeable paper.
1. Provide paper-backed lath at exterior location.

2.2 ACCESSORIES

- A. General: Comply with ASTM C 1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.
- B. Metal Accessories:
1. Foundation Weep Screed: Fabricated from hot-dip galvanized-steel sheet, ASTM A 653/A 653M, G60 zinc coating.
 2. Control Joints: Fabricated from zinc-coated (galvanized) steel; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
 3. Expansion Joints: Fabricated from zinc-coated (galvanized) steel; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.
 4. Two-Piece Expansion Joints: Fabricated zinc-coated (galvanized) steel; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4 to 5/8 inch wide; with perforated flanges.

2.3 MISCELLANEOUS MATERIALS

- A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- B. Steel drill screws complying with ASTM C 1002 for fastening metal lath to wood or steel members less than 0.033 inch thick.
- C. Steel drill screws complying with ASTM C 954 for fastening metal lath to steel members 0.033 to 0.112 inch thick.
- D. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

2.4 PLASTER MATERIALS

- A. Portland Cement: ASTM C 150/C 150M, Type I.
 - 1. Color for Finish Coats: color to match existing.
- B. Lime: ASTM C 206, Type S; or ASTM C 207, Type S.
- C. Sand Aggregate: ASTM C 897.
- D. Ready-Mixed Finish-Coat Plaster: Mill-mixed Portland cement, aggregates, coloring agents, and proprietary ingredients.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Expo Stucco Products.
 - b. LaHabra Stucco Solutions; Parex USA.
 - c. Merlex Stucco.
 - d. Or Equal.
 - 2. Color: As selected by Architect from manufacturer's full range to match existing.

2.5 PLASTER MIXES

- A. General: Comply with ASTM C 926 for applications indicated.
- B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:
 - 1. Portland Cement Mixes:

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- a. Scratch Coat: For cementitious material, mix 1 part Portland cement and 0 to 3/4 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
 - b. Brown Coat: For cementitious material, mix 1 part Portland cement and 0 to 3/4 parts lime. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.
- C. Base-Coat Mixes for Use over Concrete: Single base (scratch) coat for two-coat plasterwork on low-absorption plaster bases as follows:
1. Portland Cement Mix: For cementitious material, mix 1 part Portland cement and 0 to 3/4 part lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
- D. Factory-Prepared Finish-Coat Mixes: For ready-mixed finish-coat plasters, comply with manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.
- B. Prepare smooth, solid substrates for plaster according to ASTM C 926.

3.3 INSTALLATION, GENERAL

- A. Fire-Resistance-Rated Assemblies: Install components according to requirements for design designations from listing organization and publication indicated on Drawings.

3.4 INSTALLING METAL LATH

- A. Metal Lath: Install according to ASTM C 1063.
 1. Partition Framing and Vertical Furring: Install woven-wire lath.

[Diamond-mesh lath requires closely spaced supports when used on ceilings.](#)

2. Flat-Ceiling and Horizontal Framing: Install woven-wire lath.

3. On Solid Surfaces, Not Otherwise Furred: Install self-furring, woven-wire lath.

3.5 INSTALLING ACCESSORIES

- A. Install according to ASTM C 1063 and at locations indicated on Drawings.
- B. Control Joints: Locate as approved by Architect for visual effect and as follows:
 1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:
 - a. Vertical Surfaces: 144 sq. ft.
 - b. Horizontal and Other Nonvertical Surfaces: 100 sq. ft.
 2. At distances between control joints of not greater than 18 feet o.c.
 3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
 4. Where control joints occur in surface of construction directly behind plaster.
 5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.

3.6 PLASTER APPLICATION

- A. General: Comply with ASTM C 926.
 1. Do not deviate more than plus or minus 1/4 inch in 10 feet from a true plane in finished plaster surfaces when measured by a 10-foot straightedge placed on surface.
 2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
 3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.
- B. Bonding Compound: Apply on concrete substrates for direct application of plaster.
- C. Walls; Base-Coat Mixes for Use over Metal Lath: For scratch and brown coats, for three-coat plasterwork with 3/4-inch total thickness, as follows:
 1. Portland cement mixes.
- D. Walls; Base-Coat Mix: For base (scratch) coat, for two-coat plasterwork and having 1/4-inch thickness on concrete, as follows:
 1. Portland cement mix.
- E. Plaster Finish Coats: Apply to provide finish to match existing. Paint new plaster and entire wall from end to end.

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3.7 PLASTER REPAIRS

- A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.8 CLEANING AND PROTECTION

- A. Remove temporary protection and enclosure of other work after plastering is complete. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION 09 24 00

SECTION 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes: Framing required for gypsum board ceilings, blocking and furring channels, as required, gypsum board walls and ceilings and taped and sanded joint treatment where required, including adhesives and texturizing as indicated on the Drawings and specified herein.

B. Related Sections:

1. Section 05 40 00 – Cold-Formed Metal Framing.
2. Section 06 10 00 – Rough Carpentry.
3. Section 10 20 00 – Interior Specialties.
4. Section 09 90 00 – Painting and Coating.

1.02 REFERENCE STANDARDS

A. Work to conform to California Building Code, Chapter Title 24, Part 2.

B. Perform gypsum board systems work in strict accordance with recommendations of the following reference standards, unless otherwise specified in this section or required by local code. Keep a copy of applicable reference standards in field office for duration of project.

1. ASTM C1396 – Standard Specification for Gypsum Board.
2. ASTM C1177 – Standard Specification for Glass Mat Gypsum Substrate for use as Sheathing.
3. ASTM C475 – Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
4. ASTM C514 – Standard Specification for Nails for the Application of Gypsum Board.
5. ASTM C557 – Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
6. ASTM C1002 – Standard Specification for steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
7. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials.
8. ASTM E413 – Classification for Rating Sound Insulation.
9. ASTM C840 – Standard Specification for Application and Finishing of Gypsum Board.

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10. ASTM D3273 – Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
11. Gypsum Association - GA-216 – Recommended Specifications for the Application and Finishing of Gypsum Panel Products.
12. Gypsum Association - GA-254 – Recommended Specifications for the Fire-Resistant Gypsum Sheathing.
13. Underwriters Laboratories, Inc. (UL) - Building Materials Directory.
14. Underwriters Laboratories, Inc. (UL) - Fire Resistance Index.

1.03 SUBMITTALS

- A. Submit copies of manufacturer's product information and installation instructions for each item and accessories.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's unopened containers, packages or bundles identified with manufacturer's name, brand, type, and grade clearly marked.
- B. Store in dry areas and protect from dampness and deterioration.
- C. Protect ready-mixed products from freezing.
- D. Protect metal products from rusting.
- E. Deliver fire-rated materials bearing testing agency label and required fire classification number.

1.05 PROJECT CONDITIONS

- A. Do not install board products unless installation areas comply with minimum temperature and ventilation requirements recommended by manufacturer. As a minimum, provide temperatures above 50 degrees F. during and after installation.
- B. Under slow drying conditions, allow additional drying time between coats of joint treatment.
- C. Protect installed materials from drafts during hot, dry weather.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- C. Provide gypsum board materials manufactured by one of the following:

United States Gypsum (USG)
Pabco Gypsum
Georgia Pacific
National Gypsum Company

2.02 GYPSUM BOARD:

- A. Standard: ASTM C1396 Type I; 5/8-inch thick, Type X with U.L. designation as required by U.L. listing, tapered edges, ends square cut, maximum permissible lengths
- B. Water-resistant: 5/8-inch thick, Type X with U.L. designation as required by U.L. listing, tapered edges, ends square cut, maximum permissible lengths.
 - 1. Water Resistant Board: Use type and thickness as required for U.L. Fire description but not less than 5/8-inch U.L. labeled "WRX" meeting ASTM C1396.
 - 2. Joint Tape: SHEETROCK Joint Tape.
 - 3. Setting Type Joint Compound: Easy Sand or DURABOND by USG.
- C. 1-Hour Shaftwall: System U.L. Design U415. All components shall be by one manufacturer for unit responsibility.
 - 1. 5/8-inch USG Firecode 'C', 1-inch USG Shaftwall liner labeled "SLX".
 - 2. Use USG 'C-H' or 'E' studs. Flanges holding 1-inch liner panel shall be continuous. No tab systems. Studs shall meet.
- D. USG FIBEROCK® brand:
 - 1. VHI panel, high-density cellulose wall panels, long edges tapered to form a shallow channel for joint reinforcement. Setting-type joint compound is required.
 - 2. Panels to comply with ASTM D3273, C1629; Thickness: 5/8 inch, unless otherwise indicated.
- E. GEORGIA-PACIFIC DENSSHIELD® brand:
 - 1. Water-Resistant treated core covered front and back with acrylic coated high-density fiberglass mats.
 - 2. Panels to comply with ASTM D3273, E96; Thickness: 5/8 inch, unless otherwise indicated.
- F. GEORGIA-PACIFIC DENSGLASS®: Exterior Sheathing
 - 1. Mold and Moisture Resistant Fiberglass Mats
 - 2. Panels to comply with ASTM D3273 thickness 1/2" unless otherwise specified.
- G. Impact Resistant Gypsum Board: Interior Sheathing
 - 1. Georgia-Pacific – ToughRock®
 - 2. National Gypsum – Hi-Abuse XP®
 - 3. USG – Fiberock® Abuse-Resistant Panels

2.03 GYPSUM BOARD ACCESSORIES

- A. Provide gypsum board accessories in accordance with GA-216, and as shown on drawings and specified.
- B. Trims: Provide accessories such as corner beads and edge trim as metal fabrications. Plastic materials will not be acceptable.

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1. Cornerbead: Use SHEETROCK paper faced metal outside corner, B1 XW EL.
 2. L-Trim: Use SHEETROCK paper faced metal "L" trim, B4.
 3. J-Trim: Use SHEETROCK paper faced metal "J" trim, B9.
 4. Control Joint: Use No. 93, Amico
 5. Bullnose Cornerbead: Use SHEETROCK paper faced metal 3/4-inch, or 1-1/2 inch (as selected by Architect). Bullnose outside corner.
- C. Provide suspension system for applications of gypsum board using the components required by Drawings, and in accordance with ASTM C645, and Chapter 25, Title 24, California Building Code.
- D. Fasteners: Corrosion resistant conforming to ASTM C1002.
1. Wood Studs: Minimum 1-1/4 inch, Type W, bugle head.
 3. Metal Studs: Minimum Type S, bugle head.
 4. Ceiling Furring: S-12, bugle head at 12 inches at all edges and supports.
- E. Adhesive: Provide type manufactured by US Gypsum or other approved, appropriate for attaching board to dissimilar substrate materials shown on Drawings.
1. Gypsum board to gypsum board- Durabond or Easy Sand.
 2. Gypsum board to coreboard, or sound deadening board- Durabond or Easy Sand.
 3. Gypsum board to cementitious substrates- Durabond 90.
- F. Hanger Wire: Provide No. 8 pre-straightened hanger wires.
- G. Furring Channels: Provide 7/8-inch hat or Z-type furring channels fabricated from minimum 22 gage galvanized steel.
- H. Joint Treatment:
1. Paper tape conforming to ASTM C475, or USG Heavy Duty.
 2. Compound-powdered or ready-mixed conforming to ASTM C475. Taping and topping joint compound or all-purpose joint compound may be used.
- I. Texturing:
1. Wall Texturing: Provide materials manufactured by one of the following:

Hamilton Drywall Products
USG
National Gypsum Co.

3. Ceiling Texturing: Provide materials manufactured by one of the following:

Hamilton Drywall Products
USG
National Gypsum Co.

- J. Shims: Provide for between studs and gypsum board for level and true wall plane.
5. Drywall Channel Screeds: Provide channel screeds and moldings by Fry Reglet Corp., as shown on the Drawings. Provide custom colors as selected by the Architect.
6. Acoustical Sealant: USG SHEETROCK Acoustical Sealant.
7. Drywall Primer: USG SHEETROCK 1st Coat.
8. Setting Compound: DURABOND or Easy Sand.

2.04 EXTERIOR WALL SHEATHING

- A. Product: GEORGIA-PACIFIC DENSGLASS®: Exterior Sheathing

1. Mold and Moisture Resistant Fiberglass Mats.
2. Panels to comply with ASTM D3273 thickness 5/8".

2.05 ACCESS DOORS

- A. In partitions and ceilings installed in accordance with this Section, provide doors where shown on the Drawings and where required for access to mechanical installations and electrical installations. Verify quantity, type and location with mechanical and electrical trades.
- B. Types:
1. Refer to Specifications Section 10 20 00, and Division 23, Mechanical Sections, for types of access doors
 2. For piercing fire-rated surfaces, provide access doors having the same fire rating as the surface being pierced.
 3. For tile surfaces and toilet rooms, provide stainless steel access doors and frames, with satin finish.
 4. For other installations, provide prime-coated steel access doors and frames for finish painting to be performed at the job listed under Section 09 90 00 of these Specifications.

2.06 DRYWALL REVEAL MOLDINGS

- A. Drywall Channel Screeds: Provide channel screeds and moldings by Fry Reglet Corp., as shown on the Drawings. Provide custom colors as selected Architect.
1. 3/4-inch Model No. DRM-625-75 by Fry Reglet Corp.
 2. 2-inch Model No. DRM-625-200 by Fry Reglet Corp.
 3. 3-inch Model No. DCS-625-300 by Fry Reglet Corp.

2.07 OTHER MATERIALS

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- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the acceptance of the Architect.
- B. Metal Trim: The Drawings do not show all locations and requirements for metal trim. Carefully study the Drawings and the installation and provide all metal trim normally recommended by the manufacturer of the gypsum wall board accepted for use in this Work.

2.08 WALL SHEATHING

- A. Cementitious Fiber-Mat Reinforced Sheathing: ASTM C1325, ANSI A118.9, Cementitious Backer.
 - 1. Product: Subject to compliance with requirements, provide DUROCK® Brand Cement Board by United States Gypsum Company.
 - 2. Type and Thickness: 5/8" inch thick.
 - 3. Size: 48" by 96" inches.

2.09 FASTENERS FOR EXTERIOR WALL SHEATHING

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and application.
 - 1. Wood Screws: 1-5/8" inch bugle headed #6 screw with corrosion-resistant coating. Corrosion resistance to comply with printed submittal literature.
 - 2. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: 1-1/4" bugle headed #6 screws with corrosion resistant coating. Corrosion resistance to comply with printed submittal literature.
 - 4. For Steel Framing less than 0.329 inch thick, attach sheathing to comply with ASTM C1002.
 - 5. For Steel Framing from 0.033 to 0.112 inch thick, attach sheathing to comply with ASTM C954.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Examine the areas and conditions under which Work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 INSTALLATION

- A. Install gypsum board in accordance with the Drawings and with the separate boards in moderate contact but not forced into place.

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- B. At internal and external corners, conceal the cut edges of the boards by the overlapping covered edges of the abutting boards.
- C. Stagger the boards so that corners of any four boards will not meet at a common point except in vertical corners.
- D. Joints between wall and floor shall not exceed 1/8-inch. Where sound-rated drywall construction is indicated, seal construction at perimeters, control and expansion joints, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with ASTM C919 and manufacturer's recommendation for location of edge trim, and close off sound-flanking paths around or through construction, including sealing of partitions above acoustical ceilings.
- E. Ceilings: Install the gypsum wallboard to ceilings with the long dimension of the wallboard at right angles to the supporting members.
 - 1. Wall board may be installed with the long dimension parallel to supporting members that are spaced 16 inches on centers when attachment members are provided at end joints.
- F. Ceiling Suspension System: Carrying Channels shall be securely hung from the structure above, spaced as shown and noted on the Drawings, but in no case more than 4'-0" on center. Hanging wire shall be securely fastened to the structure above as detailed, as recommended by the manufacturer of the suspension system components and as required to meet all Building Code requirements. Installation shall conform to Division of the State Architect, IR 25.
 - 1. Hanging wires shall be securely fastened to the carrying channels, saddle-tied by at least three turns around each channel, and shall be spaced as shown and noted on the Drawings, but in no case more than 4'-0" on center.
 - 2. Channels shall be located within 6 inches of parallel walls and shall be cut short of abutting walls 1/2-inch, plus or minus 1/4-inch. Carrying channels shall be leveled with turnbuckles where required.
- G. Furring Channels shall be securely fastened to carrying channels and shall be spaced 16 inches on center, unless shown otherwise on the Drawings. Furring channels shall be fastened to carrying channels with furring clips manufactured for this purpose.
- H. Walls: Install the gypsum wallboard to studs at right angles to the furring or framing members.
 - 1. Make end joints, where required, over framing or furring members.
 - 2. Install gypsum wallboard over full height of all stud walls.
- I. Attaching:
 - 1. Drive the specified screws with clutch-controlled power screwdrivers, spacing the screws 7" to 8" on center at ceilings and 16" on center at walls.
 - 2. Where framing members are spaced 24 inches apart on walls, space screws 12" on center.

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3. Attach double layers in accordance with the pertinent codes and the manufacturer's recommendations as accepted by the Architect.
4. Attach to wood as required by governmental agencies having jurisdiction.

J. Access Doors:

1. By careful coordination with the Drawings and with the trades involved, install the specified access doors (Section 10 00 00 and specifications in Division 23, Mechanical) where required.
2. Anchor firmly into position and align properly to achieve an installation flush with the finished surface.

3.03 JOINT TREATMENT

- A. Inspect areas to be joint treated, verifying that the gypsum wall board fits snugly against supporting framework.
- B. In areas where joint treatment and compound finishing will be performed, maintain a temperature of not less than 55 degrees for 24 hours prior to commencing the treatment, and maintain temperature until joint finishing compounds have dried.
- C. Apply the joint treatment and finishing compound by machine or hand tool.
- D. Provide a minimum drying time of 24 hours between coats, with additional drying time in poorly ventilated areas.
- E. Embedding Compounds:
 1. Apply to gypsum wallboard and fastener heads in a thin uniform layer.
 2. Spread the compound not less than 3 inches wide at joints, center the reinforcing tape in the joint, and embed the tape in the compound. Then spread a thin layer of compound over the tape.
 3. After this treatment has dried, apply a second coat of embedding compound to joints and fastener heads, spreading in a thin uniform coat to not less than 6 inches wide at joints, and feather edged.
 4. Sandpaper between coats as required.
 5. When thoroughly dry, sandpaper to eliminate ridges and high points.
- F. Finishing Compounds:
 1. After embedding compound is thoroughly dry and has been completely sanded, apply a coat of finishing compound to joints and fastener heads.
 2. Feather the finishing compound to not less than 12 inches wide.
 3. When thoroughly dry, sandpaper to obtain a uniformly smooth surface, taking care not to scuff the paper surface of the wallboard.

4. Texture finish walls and ceilings to be painted. Submit a sample to the Architect for acceptance.
- 3.04 CORNER TREATMENT
- A. Internal Corners: Treat as specified for joints, except fold the reinforcing tape lengthwise through the middle and fit neatly into the corner.
 - B. External Corners:
 1. Install the specified corner bead, fitting neatly over the corner and securing with the same type fasteners used for installing the wallboard.
 2. Space the fasteners approximately 6 inches on centers, and drive through the wallboard into the framing or furring member.
 3. After the corner bead has been secured into position, treat the corner with joint compound and reinforcing tape as specified for joints, feathering the joint compound out from 8 inches to 10 inches on each side of the corner.
- 3.05 CLEANUP
- A. In addition to other requirements for cleaning, use necessary care to prevent scattering gypsum wallboard scraps and dust, and to prevent tracking gypsum and joint finishing compound onto floor surfaces.
 - B. At completion of each segment of installation in a room or space, promptly pick-up and remove from the working area all scrap, debris, and surplus material of this Section.

END OF SECTION

SECTION 09 30 00

TILING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Tile work including tile, trims, setting mortars, leveling coats, and grouting as indicated on the Drawings and specified herein.
- B. Related Sections:
 - 1. Floor and wall substrates, including plaster scratch coat, concrete and water-resistant gypsum board.
 - 2. Section 07 10 00 – Dampproofing and Waterproofing.

1.02 REFERENCE STANDARDS

- A. Perform work and provide materials in accordance with recommendations of TCA and ANSI.
- B. Comply with the Americans with Disabilities Act, Accessibility Guidelines, Section 302 Ground and Floor Surfaces.

1.03 SUBMITTALS

- A. Provide manufacturer's standard samples for selection of type, style, finish and color of units, including samples of grout available, and color samples of joint sealant.
- B. Shop drawings of expansion joint locations.
- C. Letter of acceptance of tile substrate by the tile installer.

1.04 PROJECT CONDITIONS

- A. Provide sufficient heat (except where impractical such as outdoors) and ventilate in areas where work is being performed.
- B. Take precautionary measures to ensure that excessive temperature changes do not occur.

1.05 ATTIC STOCK

- A. Contractor shall provide 5% additional material, including tile and grout after project has been completed. Place attic stock in location as directed by Project Manager.

PART 2 - PRODUCTS

2.01 CERAMIC TILES

- A. Manufacturers: Match existing tile.

- 1. Daltile Corporation

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2. American Olean
 3. Crossville Ceramics Company (distributed by Longust)
 4. Interceramic
- B. Provide impervious ceramic tile with a monolithic body pressed from porcelain particles, evenly colored throughout, of sizes as indicated, including special shapes required; colors shall from manufacturer's standard pallet in price Groups noted below. Where no price group is specified provide colors from Price Group 3.
- C. Basis-of-Design Product: The design for each tile type is based product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.
- D. For tiles to be used on floors produce a coefficient of friction of 0.60, or higher (0.80 in wet areas) accordance with pertinent provisions of ASTM C1028.
- E. Tiles for walls to be used in potentially wet areas, walls are not to be backed with paper material.
- F. Ceramic Wall Tile: Semi-Gloss, Daltile, 4-1/4-inch by 4-1/4-inch, or 6 inch by 6 inch. Color and pattern as selected by Architect. Price Group 2, 90%; Price Group 3, 10%.
- F. All ceramic tile flooring shall be stable, firm, and slip resistant, per **CBC Section 11B-302.1**.
- G. Ceramic Floor and Base Tile: Dal-Tile, Keystone 2 inch by 2-inch ceramic mosaic tile. Color and pattern as selected by Architect. Price Group 1. Install 5-inch coved base.
- H. Colors, Patterns, and Sizes: Unless shown otherwise, assume each room will have a maximum of two colors arranged in large segments as directed with a third accent band color in a checkerboard pattern a maximum of 6 courses wide. Architect selection will be from color and pattern groups of manufacturer where color or pattern are not already selected and shown on Drawings.
- I. Detectable Warning Area Tile: Terra Paving, ADA-3 Truncated Domes (Wausau Tile), 12 inch by 12 inch, or Armor-Tile, truncated vitrified polymer dome tiles, CBC, 2019, Title 24, Part 2, Chapter 11B-705.1.2.5.
1. Detectable Warnings, CBC, 2019, Title 24, Part 2, Chapter 11B-705.1.2.5, and the latest edition of California Code of Regulations / IR 11B-4: Detectable Warnings.
 - a. Square grid, in-line pattern:
 - b. Diameter of nominal 0.9 inch (22.9mm) at base tapering to 0.45 inch (11.4) at top.
 - c. Nominal height of 0.2 (5.08 mm) inch.
 - d. Nominal center to center spacing of 2.35 (59.7 mm).
 - e. Color "yellow" conforming to Federal Color No. 33538 per Standard No. 595C. CBC Chapter 11B-705.1.2.5 and 11B-810.5.2.
 2. 2016 California Building Standards Codes; DSA Bulletin, October 31, 2002 (Revised 4/9/2008) Exception to the Independent Entity Evaluation and

Product Approval of Detectable Warnings and Directional Surfaces: In the interim and until such time that the evaluation and approval program for detectable warning products and directional surfaces is fully developed, operational and product approvals can be issued, DSA will provisionally accept a written five (5) year product warranty provided by the manufacturer of detectable warnings and directional surface products as equivalent to the evaluation and product approval program. Such warranty shall indicate compliance with architectural standards as published in the current edition of the California Building Standards Code, and also include durability criteria which indicates that the shape, color fastness, confirmation, sound-on-cane acoustic quality, resilience, and attachment will not degrade significantly for at least five (5) years after initial installation.

As used in this bulletin, “not degrade significantly” means that the product maintains at least 90 percent of its approved design characteristics, as determined by the enforcing agency.

2.02 QUARRY TILES

- A. Unglazed Quarry Tile. Daltile unglazed abrasive grain, unglazed cove base, color, size, and pattern as selected by Architect. Provide square-edged flat tile complying with the following requirements:
 - 1. Wearing Surface: Abrasive aggregate embedded in surface.
 - 2. Thickness: 3/8-inch
 - 3. Face: Plain
 - 4. Coefficient of friction at least .06% (0.8% in wet areas) ASTM C1028.

2.03 WATERPROOFING MEMBRANE

- A. Provide waterproof membrane underlayment as specified in Section 07 10 00.

2.04 ACCESSORIES

- A. Trims: Provide full line of trims, coves, caps and bullnoses.

2.05 MIXES

- A. Mortar and Grout:
 - 1. At concrete substrates, provide latex-based mortar and grout materials manufactured by Laticrete or Custom-Building Products. Products manufactured by other approved will be considered.
 - a. Color: To be selected by Architect, from manufacturer's standard colors.
 - 2. Installation shall comply with CBC, 2019, Title 24, Part 2, Section 2103A and 2103A.3.
- B. Leveling Coat: Provide a latex cement leveling coat where necessary to achieve required degree of evenness.

PART 3 - EXECUTION

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3.01 EXAMINATION

- A. Inspect surfaces on or over which tile units are to be installed. Correct deficiencies of substrates prior to installation of any materials which could prevent proper application and serviceability of materials.
- B. Prior to installing materials, ensure that walls and floors are level, plumb and even to achieve required final surface variation of maximum 1/8-inch in 8 feet, except where horizontal applications are required to slope for drainage.

3.02 PREPARATION

- A. Ensure cleanliness of substrates prior to installing materials.

3.03 INSTALLATION

- A. Place materials in accordance with patterns shown on drawings or required by District. Carefully plan material layouts for largest possible cut pieces, equal at opposite sides of areas being covered. Ensure that patterns are uninterrupted unless required. Floor and wall tiles shall be installed with joints aligned vertically and horizontally.
- B. Neatly cut around fixtures, penetrations, and drains. Accurately form corners, bases, curves, intersections, caps and returns. Cut members required to be cut with power cutting tools. No other method will be accepted.
- C. Ensure that areas receiving tile units are uniform and will allow installation of units without projection of edges which could break or spall easily.
- D. Ensure that joints are uniform watertight and align in directions, including with joints of same or similar materials in other planes.
- E. Sound materials after setting. Replace and remove hollow sounding units.
- F. Build in expansion and contraction joints as work progresses, keeping mortar and grouts out. Submit suggested locations of expansion joints to Architect for review. Do not exceed 16 feet in any direction without such joints.
- G. Allow sufficient time for mortar to cure (minimum 48 hours) prior to grouting.
- H. Install units in accordance with the methods specified in the latest edition of the TCNA Handbook for Ceramic, Glass, and Stone Tile Installation as follows and as indicated on the Drawings and/or as listed as follows:

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LOCATION	SUBSTRATE	METHOD
Exterior mortar-set paver tile over slab-on-grade	cement mortar, bonded	F101
Interior mortar-set paver tile or ceramic tile over slab-on-grade	cement mortar, bonded	F111
Interior mortar set ceramic tile over slab-on-grade at toilet rooms	concrete	F121
Interior thin-set paver tile over slab-on-grade	concrete	F113
Tile shower floors	concrete	B414 F121
Interior walls, mortar set	cement mortar, plywood, wood studs	W221
Interior tile walls, mortar set	cement mortar wood studs	W231
Interior tile walls, mortar set	cement mortar metal studs	W241
Interior walls, thin set	water resistant gypsum wallboard	W243
Interior walls, thin set	cementitious backer board wood or metal studs	W244C
Tile shower / shower walls	cement mortar	B426
Exterior accent wall tile	cement mortar	W201

- I. Do not use broken, damaged units.
- J. Protect grout against staining until sealer is applied. Stained grout will be removed and replaced prior to Notice of Completion.

END OF SECTION

SECTION 09 51 00

ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.01 SUMMARY

- A. Work includes furnishing and installing acoustical lay-in units and suspension systems.
- B. Related Sections:
 - 1. Section 09 29 00 – Gypsum Board.
 - 2. Mechanical work, Division 23 00 00.
 - 3. Electrical work, Division 26 00 00.

1.02 CODES AND REFERENCE STANDARDS

- A. Acoustical panels and tile shall be listed by Underwriter's laboratories, Inc. for flame spread rating specified herein.
- B. Acoustical ceiling assemblies shall comply with the seismic design requirements of Title 24, California Building Code (CBC), Chapter 25 and Sections 803.9, 1617A.1.21 and DSA IR 25-1 and 25-2.
- C. Acoustical panels shall be made in accordance with ASTM C423 sound absorption coefficients by reverberation room method in the type E mounting described in ASTM E795 and tested per accreditation program for ASTM C423.

1.03 SUBMITTALS

- A. Submit shop drawings for review. Show sizes and locations of grids, locations of hanger wires, methods of attachment to supporting structure, and locations and framing conditions for mechanical and electrical equipment within or attached on ceiling.
- B. Submit samples of acoustical materials and suspension systems for review.
- C. Recycled Content Certification.
- D. Submit acoustical test reports from an independent acoustical testing Laboratory.

1.04 EXTRA MATERIALS

- A. Leave extra ceiling panels for Owner's use, equal to 10 percent of total number of units used on project, but in no case less than two full boxes of each pattern.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the project in original unopened packages bearing the manufacturer's name, brand designation, and label verifying compliance with these specifications. Store materials in properly protected and dry storage area.
- B. Immediately before installation, store acoustical units for not less than 24 hours at the same temperature and relative humidity as the space where they will be installed.

1.06 PROJECT CONDITIONS

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- A. Maintain a uniform temperature of not less than 60 degrees F. nor more than 85 degrees F. and a relative humidity of not more than 70 percent continuously from 24 hours before installation until 24 hours after completion of work.

1.07 SCHEDULING

- A. Wet operations such as plastering, concrete and masonry work shall be completed and dry before installation of acoustical ceilings. Mechanical, electrical and other work above the ceiling line shall be completed and approved prior to start of acoustical ceiling installation.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Acoustical materials shall be as specified herein.
- B. Use Code Approved Seismic Clip to allow for 7/8" wall angle in lieu of 2" wall angle. USG ACM7 Seismic Clip with USG M7 wall angle. With aluminum capped grids, use aluminum capped wall angle, USG M7A.

2.02 ACT-1 CEILING (2' x 4') – EXISTING – REPAIR ONLY, AS NEEDED

- A. Ceiling Grid: 24" x 48" with 15/16-inch wide grid.
- B. Ceiling Tile Pattern: Armstrong, School Zone Fine Fissured, or equal, 24" x 48" x 3/4"
Color: White. If budget allows – use Dune, No. 1773 or Ultima, No. 1915
- C. Surface Burning Characteristics (Flame Spread and Smoke Developed): Class A (Flame spread 25 or under) UL labeled per ASTM E1264. Smoke developed shall be no greater than 450 when tested in accordance with CBC Chapter 8, Section 803.
- D. **2' x 4' Acoustical Lay-in Ceiling Suspension System (Existing – repair only):**
 - 1. Suspension system shall conform to the heavy-duty classification of ASTM C635 and shall be 24" x 48" x 15/16" steel system. Minimum pre-consumer recycled content of 23% and post-consumer recycled content of 68%
 - 2. Main runners, cross tees, spacer bars, variable placement tees, grid adapters and wall moldings shall be of cold-rolled hot-dipped galvanized steel.
 - 3. Finish shall be white baked-on vinyl painted finish.
 - 4. Provide suspension system of one of the following manufacturers:
 - a. Armstrong World Industries, Inc.
Prelude XL Heavy Duty System
Main Runner – Prelude XL –7301 Heavy Duty
Cross Runner – Prelude XL – XL7340
 - b. USG Corporation
Donn® DX® Heavy Duty System
Main Runner – DX-26 Heavy Duty
Cross Runner – DX-422

- c. Chicago Metallic Corporation
Series 1200
Main Runner – 200 Heavy Duty
Cross Runner – 1274

2.05 ACT-4 CEILING - MOISTURE RESISTANT 2 x 4 LAY-IN CEILING

- A. Acoustic Tile: 24" x 48" x 3/4" Armstrong Clean Room Mylar. Surface burning characteristics: Class A Flame Spread (25 or under) UL labeled. Smoke density shall be no greater than 450 when tested in accordance with Title 24, California Building Code (CBC), 2019, Chapter 8.
 - 1. Lay-in-boards shall feature scrubbable surface with HumiGuard Plus, sag resistance, and Bioblock Paint that inhibits the growth of mold and mildew.
- B. Surface Burning Characteristics (Flame Spread and Smoke Developed): Class A (Flame spread 25 or under) UL labeled. Smoke density shall be no greater than 450 when tested in accordance with Title 24, California Building Code (CBC), 2019, Chapter 8.
- C. 2' x 4' Acoustical Lay-in-Ceiling Suspension System (existing – repair only):
 - 1. Suspension system shall conform to the heavy-duty classification of ASTM C635 and shall be 24" x 48" x 15/16" steel system. Minimum pre-consumer recycled content of 23% and post-consumer recycled content of 68%.
 - 2. Main runners, cross tees, spacer bars, variable placement tees grid adapters and wall moldings shall be of cold-rolled hot-dipped galvanized steel.
 - 3. Finish shall be white baked-on vinyl finish.
 - 4. Provide suspension system of one of the following manufacturers.
 - a. Armstrong World Industries, Inc.
Prelude XL Heavy Duty System
Main Runner –Prelude XL - 7301 Heavy Duty
Cross Runner– Prelude XL - XL7340
 - b. USG Corporation
Donn® DX® Heavy Duty System
Main Runner – DX-26 Heavy Duty
Cross Runner – DX-422
 - c. Chicago Metallic Corporation
Series 1200
Main Runner – 200 Heavy Duty
Cross Runner – 1274

PART 3 - EXECUTION

3.01 GENERAL

- A. Examination of surfaces and conditions affecting proper installation of the materials, and reporting defects in materials or surfaces to which acoustical tile is applied. Commencement of work will signify acceptance of above indicated materials and surfaces as satisfactory.

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3.02 INSTALLATION

- A. Layout work in accordance with reviewed and approved shop drawings. Adjust spacing of runners to achieve intent of drawings.
- B. Secure perimeter acoustical moldings to walls at maximum 2 foot intervals, with power driven studs for cementitious substrates, and with screws at 16-inch intervals at stud walls. Provide moldings at perimeters of penetrations and room areas. Attach border units for clean finish and tight appearance.
- C. Unless shown otherwise, ensure that installed tiles are square within each room area, in continuous lines parallel to walls, symmetrical about centerline of room area.
- D. Drill holes for pipes. Tiles cut from sides to permit penetration and installation of other construction will not be acceptable.

3.03 SUSPENSION SYSTEM INSTALLATION

(Division of the State Architect Interpretation of Regulations, IR 25-1 and 25-2)

- A. 12-gauge (minimum) hanger wires may be used for up to and including 4'-0" x 4'-0" grid spacing. Splices will not be permitted in hanger wires unless specifically approved by DSA/Structural Safety Section.
- B. Provide hanger wires within 8 inches of the ends of main and cross runners or at one-quarter of the length of the end tee, whichever is least at the perimeter of the ceiling area.
- C. Provide trapeze or other supplementary support members at obstructions to maintain hanger spacing. Provide additional hangers, struts or braces as required at ceiling breaks, soffits or discontinuous areas. Hanger wires that are more than one in six out of plumb are to have counter braced wires.
- D. Ceiling grid members may be attached to not more than two adjacent walls. Ceiling grid members should be at least 1-1/2-inch free of other walls. If walls run diagonally to ceiling grid systems runners, one end of main and cross runners should be free and a minimum of 1/2-inch clear of wall.
- E. At the perimeter of the ceiling area where main or cross runners are not connected to the adjacent wall, provide interconnection between the runners at the free end to prevent lateral spreading. A metal strut or one 16 gage wire with a positive mechanical connection to the runner may be used. Where the perpendicular distance from the wall to the first parallel runner is 12-inches or less, this interlock is not required.
- F. Provide in sets of four, No. 12 gage splayed bracing wires oriented 90 degrees from each other and compression strut as indicated in the Drawings, at the following spacing:
 - 1. For school buildings, place sets of splay wires at a spacing not more than 12 feet by 12 feet on center.
 - 2. Provide splay wires at locations not more than one-half the above spacing from each perimeter wall or at the edge of vertical ceiling offsets for both school and hospital buildings.
 - 3. The slope of these wires should not exceed 45 degrees from the plane of the ceiling and should be taut without causing the ceiling to lift. Splices in bracing wires are not permitted without special DSA/Structural Safety Section approval.

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- G. Fasten hanger wires with not less than three tight turns. Fasten splay wires with four tight turns. Make tight turns within a distance of 1-1/2 inches. Hanger or bracing wire anchors to the structure should be installed in such a manner that the direction of the wire aligns as closely as possible with the direction of the forces acting on the wire.
- H. Separate ceiling hanging and bracing wires at least 6 inches from unbraced ducts, pipes, conduit, etc. It is acceptable to attach lightweight items, such as single electrical conduit not exceeding 3/4-inch nominal diameter, to hanger wires using connectors acceptable to DSA/Structural Safety Section.
- I. When drilled-in concrete anchors or shot-in anchors are used for hanger wires, one out of ten must be field tested for 200 pounds of tension. When drilled-in concrete anchors are used for bracing wires, one out of two must be field tested for 440 pounds in tension. Shot-in anchors are not permitted for bracing wires. If shot-in or drilled-in anchor fails, adjacent anchors must be tested.
- J. Attach light fixtures to the ceiling grid runners to resist a horizontal force equal to the weight of the fixtures.
- K. Fixtures and air terminals or services supported on intermediate duty grid systems must be independently supported by not less than four taut No. 12 gage wires attached to the structure above.

Flush or recessed light fixtures and air terminals or services weighing 56 pounds or more must be independently supported by not less than four No.12 gage taut wires attached to the structure above regardless of the type of ceiling grid system used. The (4) four taut No.12-gauge wires including their attachment to the structure above must be capable of supporting four times the weight of the unit.
- L. Flush or recessed light fixtures and air terminals or services weighing less than 56 pounds, may be supported directly on the runners of a heavy-duty grid system. In addition, they must have a minimum of two (2) 12-gauge slack safety wires attached to the fixture at diagonal corners and anchored to the structure above. All 4 ft. by 4 ft. light fixtures must have slack safety wires at each corner.
- M. Support surface mounted light fixtures by at least two positive devices which surround the ceiling runner, and which are supported from the structure above by a No.12 gage wire. Spring clips or clamps that connect only to the runner are not acceptable.
- N. Support pendant mounted light fixtures directly from the structure above with hanger wires or cables passing through each pendant hanger and capable of supporting four times the weight of the fixture.

3.04 LAY-IN PANEL INSTALLATION

- A. Install factory pre-fabricated acoustical units manufactured specifically for the drop-in and for the concealed suspension system per manufacturer's specifications and directions.

3.05 CLEANUP

- A. Replace loose and damaged tile and panels when directed. Touch-up damaged finish. Leave surfaces clean and free from markings and other disfigurements. Remove debris resulting from the work of this section.

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END OF SECTION

SECTION 09 54 53

FIBERGLASS REINFORCED PANEL - WALL

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Installation of fiberglass reinforced plastic panels (FRP) as shown on Drawings and specified herein.
- B. Related Work:
 - 1. Section 06 10 00 – Rough Carpentry.
 - 2. Section 09 29 00 - Gypsum Board.

1.02 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each material and component parts, including data substantiating materials comply with requirements.
- B. Samples: Submit full range of color samples for each type of panel, trim and accessory required. Provide 3-inch square samples of sheet materials and 3 inch lengths of trim members for color verification after selections have been made.
- C. Certificate of Compliance: Submit manufacturer's certification that all materials furnished for project comply with requirements specified herein.
- D. Maintenance Replacement Panels: Furnish following maintenance replacement panels to Owner, in location as directed and obtain signed receipt.
 - 1. Nearest number of full-size panels and trim shapes to equal one percent of total material installed.

1.03 QUALITY ASSURANCE

- A. General: Comply with requirements of Section 01 33 00 – Submittal Procedures.
- B. Regulatory Approval: Components and system must be on approved list of the following:
 - 1. USDA (US Department of Agriculture) for use in commercial kitchens.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be inspected immediately upon delivery and defects reported. Damaged or deteriorated materials shall be removed from the premises.
- B. Remove panels from shipping skid and restack on a solid, flat, dry surface. Do not stack on fresh concrete floors or other surfaces that may emit moisture. Lay panels flat. Do not store on edge.
- C. Panels should be acclimated at least 24 hours in temperature and humidity conditions approximating the operating environment of the finished room.

PART 2 - PRODUCTS

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2.01 MANUFACTURER

- A. Product: Subject to compliance with requirements, provide Marlite Standard FRP, Santa Fe Springs, CA, 90670, Phone: (562) 926-7208 or approved equal.

2.02 PANELS

- A. Panel: Standard FRP Panels.
- B. Color: As selected by Architect.

2.03 COMPONENTS

- A. Provide adhesives, sealants, moldings, fasteners and other components for complete system as made by manufacturer of panel product or recommended in writing by such manufacturer as best suited for purpose intended.
 - 1. Moldings: Vinyl moldings, colored to match panels, as recommended by manufacturer for each particular condition.
 - 2. Sealant: Super Silicone Adhesive, white for white panels, clear for colored panels.
 - 3. Adhesive: Moisture-retardant Type I material designed for securement of FRP panels to gypsum drywall.
 - 4. Fasteners: Stainless steel, with painted checkered head color to match panels or moldings.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Wall Preparation: Substrate must be flat, clean, dry and free of all dirt, dust or grease.

3.02 INSTALLATION

- A. Comply fully with recommendations of manufacturer and final shop drawings, and to conform to USDA requirements.
- B. Install units in configurations as shown on final shop drawings and in accordance with manufacturer's instructions. Keep vertical lines straight and plumb. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim and accessories for complete installation.
 - 1. Unless otherwise indicated or approved, secure panels with adhesive directly to gypsum drywall backer panels. Comply with panel manufacturer's recommendations.
 - a. Provide supplemental mechanical fasteners only if required by conditions, and as indicated on final shop drawings.
 - 2. Provide appropriate moldings at all panel joints, internal and external corners, at intersections with other construction, elsewhere as required.

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- 3. Seal panels at moldings full length, at edges of cutouts for piping and the like, at tops and bottoms of panels, and at all other intersections with other construction.

- C. Coordinate installation with that of trades providing studs and other concealed supports. Locate all fasteners only over centers of concealed supports, including properly located and installed nailers or support plates between studs where required.

3.03 CLEANING, ADJUSTMENT, INSTRUCTIONS

- A. Verify that accessories required for each unit are properly installed.

- B. Clean surfaces in accordance with manufacturer's instructions.

- C. Provide instructions to Owner's maintenance staff on care of panel surfaces.

END OF SECTION

SECTION 09 65 00

RESILIENT FLOORING

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Resilient tile flooring (LVT, VTC, Linoleum)
 - 1. Resilient Flooring shall be stable, firm, and slip resistant. CBC Section 11B-302.1
- B. Resilient base.
- C. Stair Nosing
- D. Installation accessories.

1.02 RELATED SECTIONS

- A. Drawings and provisions of the Contract including General and Supplementary Conditions and other Division 01 Specification Sections apply to this section as if repeated herein.
- B. Section 09 68 13 – Tile Carpeting: Coordination and transitions.

1.03 REFERENCES

- A. California Building Code
- B. ASTM E 648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
- C. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- D. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile.
- E. ASTM F1861 - Standard Specification for Resilient Wall Base.
- F. FS L-F-475 - Floor Covering Vinyl, Surface (Tile and Roll), with Backing; Federal Specifications and Standards; Revision A.
- G. ASTM F2034 Standard Specification for Sheet Linoleum Floor Covering: Type 1

1.04 PERFORMANCE REQUIREMENTS

- A. Conform to 2019 CBC for fire performance ratings as follows:
 - 1. Flame spread: Maximum 75, per ASTM E84.
 - 2. Smoke developed: Maximum 450, per ASTM E84.
 - 3. Conform to Critical Radiant Flux Class 2.
- B. Coefficient of Friction: 0.6 minimum per ASTM D2047

1.05 SUBMITTALS

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- A. See Section 01 33 00 – Submittal Procedures: for Administrative Requirements.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Selection Samples: Submit manufacturer's complete set of color samples for StudioWC's initial selection.
- D. Verification Samples: Submit two samples, 12 x 12 inch in size illustrating color and pattern for each resilient flooring product specified.
- E. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- F. Certification for Fire Performance: Submit certification from an independent laboratory acceptable to authorities having jurisdiction that resilient flooring complies with fire test performance requirements.

1.06 QUALITY ASSURANCE:

- A. Manufacturer's Qualifications: Provide resilient flooring and accessories as produced by a single manufacturer including primers, adhesives sealants and leveling compounds for each floor type.
- B. Installer's Qualifications: Firm specializing in the installation of resilient flooring products with not less than three years experience in the installation of resilient flooring products similar to that required for this project.

1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Protect roll materials from damage by storing on end.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Maintain temperature in storage area between 55 degrees F and 90 degrees F. Verify with specified manufacturer requirements.
- B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F. Verify with selected manufacturer requirements.

1.09 EXTRA MATERIALS

- A. See Section 01 60 00 - Product Requirements: for additional provisions.
- B. Tile Flooring: Furnish not less than one box for each fifty boxes or fraction thereof for each type, color, pattern and size installed.
- C. Top Set Rubber Base: Furnish not less than 50 lineal feet of each type, color, pattern and size installed.

- D. Sheet Flooring: Furnish not less than 5 percent additional stock for each type, color, pattern and size installed.

1.10 SUSTAINABILITY

- A. Provide sustainability certificates/letter for the following:

- IEQ Credit 4.3
 - MR Credit 4
 - MR Credit 5

PART 2 – PRODUCTS

2.01 MATERIALS - TILE FLOORING

- A. Luxury Vinyl Tile Plank: Homogeneous, with color extending throughout thickness: Class 2 - Through Pattern
 - 1. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
 - 2. Size: 4" x 36"
 - 3. Thickness: 0.125 inch.
 - 4. Pattern: Reference Architectural Finish Schedule on Drawings.
 - 5. Coefficient of Friction: 0.6 minimum per ASTM D2047.
 - 6. Manufacturers:
 - a. Armstrong World Industries, Inc.; Natural Creations with Diamond 10 Technology, or equal.
 - 7. Color: As indicated per finish schedule and drawings.

MATERIALS – RESILIENT SHEET FLOORING

- A. Resilient sheet flooring, wall base, adhesives and subfloor preparation products and accessories:
 - 1. Armstrong Flooring Inc., 2500 Columbia Avenue, Lancaster, PA 17603, or equal. Manufacturer must have a headquarters in the United States of America.
 - 2. Provide Rejuvenations™ Restore with Diamond 10 Technology Heterogeneous Sheet Flooring with integral flash coved base.

Description: A multi-layered construction consisting of a clear vinyl wear layer and a printed, reinforced fiberglass inner layer on a foamed vinyl backing. Protected by a UV-cured, high performance diamond-infused polyurethane finish, the wear surface has an overall embossed texture. Colors are insoluble in water and resistant to cleaning agents and light.

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- a) Heterogeneous sheet flooring shall conform to the requirements of ASTM F1303 Standard Specification for Sheet Vinyl Floor Covering with Backing, Type I, Grade 1, with Class C backing
 - b) Pattern and Color: in [%COLOR%][color selected from the range currently available from Armstrong Flooring Inc.]
 - c) Width: 6 ft. 7 in. (2.0 m).
 - d) Length: up to 72.2 lineal feet (22 meters)
 - e) Thickness: 0.125 in. (3.2 mm)
 - f) Wear layer thickness : 0.022 in. (0.55 mm)
 - g) Delta IIC: 21db
4. Vinyl Weld Rod: Provide solid color vinyl weld rod as produced by Armstrong Flooring Inc., and intended for heat welding of seams. Color shall be compatible with field color of flooring or as selected by Architect to contrast with field color of flooring. Color selected from the range currently available from Armstrong Flooring Inc., equal.
5. Seam Adhesive: Provide Armstrong Flooring S-761 Seam Adhesive at seams as recommended by the resilient flooring manufacturer.
6. Provide Armstrong S-599 ChoiceStrong™ Vinyl Sheet Adhesive Premium Commercial for field areas and Armstrong and S-580 Flash Cove Adhesive at flash coving as recommended by the flooring manufacturer.
7. For priming plywood floor to aid in adhesive bond strength and reducing subfloor porosity, provide S-454 Prime Strong™ acrylic primer for porous substrates.
8. For creating a moisture barrier, provide S-452 Seal Strong™ two part moisture mitigation system.
9. For sealing joints between the top of wall base or integral cove cap and irregular wall surfaces such as masonry, provide plastic filler applied according to the manufacturer's recommendations.
10. Provide top edge trim caps of plastic zero reducer for integral flash cove as approved by the Architect.
11. Provide a fillet support strip for integral cove base with a minimum radius of 1 in. (2.54 cm) of wood or plastic.
12. Provide transition/reducing strips tapered to meet abutting materials.

2.03 MATERIALS - STAIR | RAMP COVERING

A. Stair Warning Stripe

1. Warning Stripe; 2" contrasting strip on stair treads, set back 1" maximum from edge of nosing or landing. Provide warning stripe on each tread and top landing of exterior stairs. Provide warning stripe on top landing and bottom tread nosing only at interior stairs.
2. Color: 70% contrasting recommended.
3. California, Title 24, Compliant.
4. Manufacturers:
 - a. Wooster Products; Model WP-24A.

2.04 MATERIALS – BASE

A. Resilient Base: ASTM F 1861, Type TS rubber, vulcanized thermoset; top set Style A, Straight, and as follows:

1. Height: 4 inch or as indicated.
2. Thickness: 0.125 inch thick.
3. Finish: Matte.
4. Length: Roll.
5. Color: Reference Architectural Finish Schedule on Drawings.
6. Accessories: Premolded external and internal corners and end stops.
7. Manufacturers:
 - a. Roppe Corp.
 - b. BurkeMercer Flooring Products: www.burkemercer.com.
 - c. Johnsonite, Inc: www.johnsonite.com.

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2.04 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers and Seaming Materials: Waterproof; types recommended by flooring and adhesive manufacturer.
- C. Moldings and Edge Strips: Metal.
- D. Filler for Coved Base: Plastic.
- E. Sealer and Wax: Types recommended by flooring manufacturer.
- F. Adhesive: Shaw 6500 Ultra Premium VCT Adhesive.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- B. Verify that sub-floor surfaces are dust-free and free of substances which would impair bonding of adhesive materials to sub-floor surfaces.
- C. Verify that concrete sub-floor surfaces are ready for resilient flooring installation by testing for moisture emission rate and alkalinity in accordance with ASTM F710; obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- B. Prohibit traffic until filler is cured.
- C. Clean substrate.
- D. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.03 INSTALLATION - TILE FLOORING

- A. Install in accordance with manufacturer's instructions.
- B. Mix tile from container to ensure shade variations are consistent when tile is placed.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Set flooring in place, press with heavy roller to attain full adhesion.
- E. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.

- F. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.
 - G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated. Before installation of flooring, secure metal strips with stainless steel screws.
 - H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
 - I. Install flooring in recessed floor access covers. Maintain floor pattern.
 - J. At movable partitions, install flooring under partitions without interrupting floor pattern.
 - K. Install feature strips and floor markings where indicated. Fit joints tightly.
 - L. Install flooring within adjacent accessible knee space area at casework sinks and workspace recesses. Maintain floor pattern.
- 3.04 INSTALLATION – BASE
- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
 - B. Install pattern where indicated.
 - C. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
 - D. Install base on solid backing. Bond tightly to wall and floor surfaces.
 - E. Scribe and fit to door frames and other interruptions.
- 3.05 CLEANING
- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
 - B. Clean, seal, and wax resilient flooring products in accordance with manufacturer's instructions. Provide a minimum of 4 coats of wax. Buff to a high shine.
- 3.06 PROTECTION OF FINISHED WORK
- A. Prohibit traffic on resilient flooring for 72 hours after installation.

END OF SECTION

SECTION 09 68 13

TILE CARPETING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This section includes the following:
 - 1. Tufted carpet tile.
- B. Related sections:
 - 1. 02 41 19 Selective Demolition

1.03 SUBMITTALS

- A. Manufacturer's Data - Submit two (2) copies of manufacturer's specifications and installation instructions for carpet tile and related items specified. Manufacturer shall also submit a plan for recycling the specified carpet tile and related items at the end of useful life of the carpet.
- B. Fiber and backing verification - Certification from the producer verifying use of the branded fiber and backing in the submitted carpet product. Certification should include the % recycled content by weight for fiber and backing, describing the source of this recycled content. If virgin nylon or backing is used, the manufacturer shall include as part of the fiber and backing certification, the precise method that will be used to recapture the nylon and backing at the end of the useful life of the carpet tile. State how it will be returned to carpet production, fiber into fiber and backing into backing. Fiber types shall not be mixed to facilitate future recycling.
- C. Shop Drawings - Submit shop drawings for areas to be carpeted showing installation of carpeting, seam diagram, pattern direction, necessary installation accessories, and provisions for work of other trades. Show location of different patterns or styles of carpet. Also, show locations of any threshold conditions.
 - 1. The construction manager will supply reproducible prints on request, to facilitate shop drawing preparation.
- D. Samples - Submit standard size carpet samples of each type of carpet, in each specified pattern, color and construction.
 - 1. Any alternates to specified products) must be submitted for approval by a representative of the end user at least ten (10) working days prior to bid or proposal.
 - 2. Final Sample Submittal - Submit two (2) sets of samples for each carpet type.

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3. No carpet shipments are permitted until acceptance of final samples by representative of the end user or architect/design firm, certifying that samples are the approved color, pattern, and texture. No carpet shipments are permitted until the fiber and backing certifications and recycling plans are approved by the end user or architect/design firm.
 4. Custom Color Only - Quality color samples shall be signed by a representative of the end user or architect/design firm, certifying that samples are the approved color, pattern, and texture.
 5. Samples submitted will be assumed to be the manufacturer's best obtainable match to the carpet described under Materials section.
- E. Maintenance Instructions - Submit to the District two (2) copies of the manufacturer's carpet maintenance instructions, including information needed for the removal of common stains from each type of carpet required.
- F. Recycling Instructions - Submit to the District two (2) copies of the manufacturer's instructions on post-consumer recycling of the specified carpet tile and related items.
1. A representative from the carpet manufacturer shall meet with the Construction Manager in the presence of a representative of the end user and architect/design firm to review the recommended procedures, prior to occupancy of the finished spaces.

1.04 QUALITY ASSURANCE

- A. Manufacturer - Carpet manufacturer shall have no less than three years of production experience with recyclable carpet tile (fiber to fiber and backing to backing) similar to type specified in this document; and whose published product literature clearly indicates compliance of products with requirements of this section.
1. Single source responsibility - provide product material by a single manufacturer for each recyclable carpet type specified.
 2. Commitment to sustainability - carpet manufacturer must practice environmental responsibility through programs of source reduction, recycling, reuse, and conservation.
- B. Trade Contractor - firm with not less than five years of successful carpet tile experience similar to work of this Section and recommended and approved by the carpet manufacturer. Upon request, submit letter from carpet manufacturer stating certification qualifications and acceptance of all environmental requirements.
1. Participant in environmental program including responsible carpet removal, recycling and installation
- C. Substitutes - Where a selected manufacturer or product has been specified, an equal or superior product may be accepted only upon review and written acceptance by the architect. It is mandatory that such review and approval be obtained prior to bidding, or the substitution will not be considered. All such proposed substitutions shall be submitted to the architect with appropriate manufacturer's specifications, literature, environmental compliance assurance, and independent laboratory testing data. The architect's decision as to whether a product is equal or superior to the one specified shall be final. This section applies to any "or equal" noted in the specification.

1.05 PRODUCT DELIVERY AND STORAGE

- A. Deliver carpeting materials in sealed protective packaging for carpet tile and sealed containers for related materials. Carpet materials shall be bound with secure protective wrapping. Consideration should be given to bulk packaging of carpet tile when delivery is made to the jobsite for immediate installation to reduce packaging waste.
- B. Storage and staging area at the site must be coordinated with the Construction Manager.
- C. Provide 3% overage of calculated yardage for each type of carpet (calculated yardage shall include carpet needed for complete installation plus waste and usable scraps).
 - 1. Deliver specified overrun and usable scraps of packages to owner's designated storage space, properly packaged (boxed) and identified. (Redirect small pieces of waste carpet to be appropriately recycled.)
- D. Materials shall be stored in an enclosed and dry area protected from damage and soiling.

1.06 PRE-INSTALLATION MEETING

- A. The manufacturer shall meet at the project site with representatives of end user, Construction Manager and the Trade Contractor to review the carpet installation procedure and coordination with other trades. The Trade Contractor must have available at this meeting the carpet manufacturer's installation procedures, instructions for the carpet types specified in the various applications required, and recycling procedures outlined in the manufacturer's environmental program.
- B. Store carpet in working areas which have been enclosed and have maintained environmental conditions as those planned for occupancy. Carpet shall be allowed to reach room temperature or minimum temperature recommended by manufacturer before installation.

1.07 WARRANTY

- A. Provide warranties by Carpet Manufacturer and Trade Contractor agreeing to replace defective materials and workmanship of carpet work during one (1) year warranty period following Notice of Completion. Also, submit carpet manufacturer's warranties as follows:
 - 1. Wear - Surface wear shall not be more than 10% by weight throughout the life of the product.
 - 2. Static - Carpet will maintain static generation at less than 3.5 KV at 70 degrees F, and 20% R.H. throughout the life of the product.
 - 3. No delamination throughout the life of the product.
 - 4. No edge ravel throughout the life of the product.
 - 5. No dimensional instability, i.e. shrinkage, curling, and doming which adversely affect the ability of the tile to lay flat throughout the life of the product (per installation instructions). See Aachen test.
 - 6. Colorfastness Warranties: Lifetime Colorfastness to Light, Lifetime Colorfastness to Atmospheric Contaminants for 100% solution dyed nylon products.

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- 7. Stain Removal: Lifetime Stain Removal Limited Guarantee
- 8. Manufacturer must take back carpet free of charge for quantities above 500 yds.
- B. Submit manufacturer's certified independent test results to show that carpet meets or exceeds product performance specification criteria for carpet testing requirements (i.e. see section 2.3 flame, smoke, Aachen test, etc.).
- C. Lifetime Commercial Limited Warranty (Owner's Option) - Owner will be completely satisfied with the performance of the carpet product when installed in accordance with the manufacturer's current installation specifications and is maintained in accordance with the current carpet care recommendations and such maintenance continues throughout the duration of the original installation when owned and maintained by the original end user. Further, owner will be satisfied with the recycling of the product at the end of its useful life as outlined in the manufacturer's environmental program.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Subject to the minimum requirements listed above and below, provide carpeting as specified.
 - 1. Colors and patterns of carpet shall match samples.
 - 2. A preference will be given to manufacturers recycling 100% of the reclaimed carpet tile back into carpet tile with recycled content.
 - 3. The product must be capable of disassembly, with nylon returned to nylon carpet yarn production and the backing returned to carpet backing production.
 - 4. The product must meet the guidelines of Presidential Executive Order 13101 and meet the spirit of section 6002 of the Resource and Recovery Act (RCRA).
- B. Manufacturer is ISO 9001 and 14001 certified or equivalent.
- C. Tarkett Allee or equal.

2.02 CARPET TILE

- A. Package Marking - Mark each carpet package according to style, color, pattern, dye lot, run number and quantity. Within each continuous carpet area, install carpet from same dye lot and run.
- B. Carpet Construction Specification - All yarn and carpet shall be manufacturer's first quality and 100% recyclable.

2.03 CARPET SHALL MEET THE FOLLOWING PERFORMANCE STANDARDS:

- A. Carpet flammability
 - 1. Pill Test (ASTM D2859 or CPSC FF1-70): Passes
 - 2. Radiant Panel Test (ASTM E648): > .45 watts/cm2, Class I

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B.	Smoke Density (ASTM E662):	< 300 Flaming Mode
C.	Dimensional Stability (Aachen Method DIN 54318):	< 0.2% change
D.	Static Generation at 700 F. (AATCC 134 w/neolite):	< 3.5 KV at 20% R.H.
E.	Lightfastness (AATCC 16E):	4.0 after 60 hours
F.	Crocking (AATCC 165):	4.0 wet, dry
G.	Cold Water Bleed (AATCC 107):	4.0
H.	Sublimation (AATCC 117):	4.0
I.	Gas Fade (AATCC 23):	4.0
J.	Ozone Fade (AATCC 109):	4.0
K.	Antimicrobial (AATCC 174, part I or part II):	Pass
L.	Fungicidal (AATCC 174, part III):	No growth
M.	Appearance Retention Rating (ASTM D-5252 or ASTM D-5417):	Moderate or Heavy use classification
N.	CRI Green Label Plus Air Quality Certification	Passes
O.	PPM Fluorine (AATCC 189)	Minimum 350 ppm
2.04	PRODUCT SPECIFICATIONS	
A.	Product (100% recyclable)	24" Modular Tile
B.	Construction Type	Patterned Loop
C.	Gauge	5/64
D.	Stitches	10/inch
E.	Pile Density (UM 44D)	0.187 inch
F.	Backing Structure	ER3 Modular, or equal
K.	Recycled Content	45-66% overall and 14% post consumer
L.	Cradle to Cradle Certified	Must be MBDC Cradle to Cradle Certified Silver
M.	Size	24 in. x 24 in.
N.	Base Color Method	Solution Dyed
2.05	MINIMUM CONSTRUCTION STANDARDS IN ADDITION TO PRODUCT SPECIFICATIONS	

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- A. Antimicrobial with broad spectrum efficacy against bacteria and fungus for the life of the product (see product specification). Minimizes likelihood of Building Related Illness, Sick Building Syndrome, and assists in improving Indoor Air Quality.
- B. Carpet tile backing shall contain pre consumer and post consumer recycled content.

2.06 RELATED CARPET MATERIALS

- A. Leveling Compound - Latex type as recommended by carpet manufacturer and is compatible with carpet adhesive and curing/sealing compound on concrete.
- B. Releasable pressure sensitive type adhesive - Use the following as recommended by the carpet manufacturer which will allow removal of carpet at any time without damage or adherence to carpet: N5000 low VOC (no solvents) carpet tile adhesive.
- C. Multi-purpose Adhesive - Provide the following adhesive as recommended by carpet manufacturer for direct glue-down of carpet on steps.
- D. Carpet Edge Guard, Nonmetallic - Extruded or molded heavy duty vinyl or rubber carpet edge guard of size and profile indicated and with minimum 2 inch wide anchorage flange; colors selected by architect/designer from among standard colors available within the industry.
- E. Miscellaneous Materials - As recommended by manufacturer of carpet, cushion and other carpeting products and selected by Trade Contractor to meet project circumstance and requirements.

PART 3 - EXECUTION

3.01 PRE-INSTALLATION REQUIREMENTS AND PREPARATORY WORK

- A. The Trade Contractor shall measure carefully and check all dimensions and other conditions in the field to insure proper fit in the areas designated. Trade Contractor shall be totally responsible for the accuracy of his measurements on total yardage requirements, individual floor yardage requirements and dye lot yardage requirements. No request for carpet or installation extras from the owner will be considered due to measurement or takeoff errors by the Trade Contractor. The Trade Contractor shall confirm total yardage required, including 3% attic stock along with bid.
- B. The Trade Contractor shall coordinate all installation activities with the Construction Manager.
- C. Removal of carpet to be replaced (if applicable) should be handled according to preapproved plan for reuse and/or recycling. See carpet reclamation specification.
- D. Sequence carpeting with other work so as to minimize possibility of damage and soiling of carpet during remainder of construction period. Carpet installation must not commence until painting and finishing work is complete and ceiling and other overhead work has been tested, approved and completed, unless specifically approved by owner's Project Manager, in writing.
- E. Trade Contractor and manufacturer's representative must examine substrates for conditions over which carpeting is to be installed.

1. New concrete shall be allowed to cure for ninety (90) days before carpet installation.
 2. Trade Contractor shall perform moisture content testing as required in manufacturer's instructions to ensure pH readings of no more than 9. Moisture transmission of 5.5 pounds per sqm per 24 hours is acceptable. If values exceed this level manufacturer's recommendations must be followed for moisture transmission mitigation. Do not proceed until unsatisfactory conditions are corrected.
 3. Cracks 1/16 inch or more, holes, unevenness and roughness must be filled, leveled and made smooth with a compatible latex floor patching compound. Prior to filling, the floor must be swept clean of all loose granular debris. After filling, allow filler to dry. Then damp mop the floor with warm water and allow to dry. Vacuum after mopping, to ensure all loose granular debris is removed and provide a proper substrate to install carpet.
- F. All surfaces to receive carpet shall be clean and dry, and in a condition satisfactory to the Trade Contractor. Trade Contractor shall notify Construction Manager in writing of any conditions which will prevent him from producing satisfactory finish work after above specified preparatory work is completed.
- G. Trade Contractor shall vacuum floors again immediately before installation of carpeting.
- H. Confirm compatibility of adhesive with curing compounds on concrete floors. All adhesives and curing compounds shall comply with the CRI Green Label Certification program for low VOC.
- I. Environmental Conditions - Areas to be carpeted must be pre-heated at a minimum of 68° F. for 72 hours prior to installation with the relative humidity not more than 65%. A minimum temperature of 50° F. shall be maintained thereafter. Carpet and adhesive must be stored at a minimum temperature of 68° F. for 72 hours prior to installation.
- J. Once the Trade Contractor commences installation work under this contract, it shall be assumed that the condition of the floor has been accepted and any repairs or further corrections in the floor surface shall become the responsibility of the Trade Contractor.

3.02 INSTALLATION

A. General

1. Comply with manufacturer's instructions and recommendations for uniformity of direction of carpet installation.
2. Install carpet under open-bottom obstructions and under removable flanges and furnishings, and into alcoves and closets of each space.
3. Provide cut outs where required. Conceal cut edges with protective edge guards or overlapping flanges.
4. Run carpet under open-bottom items such as heating convectors and install tight against walls, columns and cabinets so that the entire floor area is covered with carpet. Cover over all floor type door closures.

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5. Install edging guard at all openings and doors wherever carpet terminates, unless indicated otherwise. Prior to installation, report to the Construction Manager all other obstructions which may occur.
6. Cutting shall be done in accordance with the manufacturer's recommendation, using the tools designed for the carpet being installed. Scraps shall be retained or disposed of per the manufacturer's environmental program.
7. Edges shall be butted together with the proper pressure to produce the tightest joint possible without distortion.
8. All carpet shall be installed with pile-lay in the same direction except when directed to use a quarter turned method as specified in the drawings.
9. Use leveling compound where necessary. Any floor filling or leveling shall have a minimum of 4'0" of feather.
10. Expansion joints - Do not bridge building expansion joints with continuous carpeting. Provide for movements.

B. Installation

1. Install carpet according to carpet manufacturer's printed instructions.
2. Measuring - Divide the room into four quadrants and snap a chalk line. Make sure quadrants meet at right angles (offset the center line, if necessary, to ensure that perimeter tiles will be cut no less than half size (9 inches).
3. Apply environmentally approved adhesive as per instructions in the area to be carpeted first.
4. Note carefully if the product is designed to be installed "quarter turned" only. Arrows should point in the same direction every other tile and diagonally. Arrows on alternating tiles should be turned 90° in either direction, consistently.
5. Begin installing by laying an anchor row of tiles on one side of the center chalk line. Ensure straight lines and square corners. Repeat anchor rows in each quadrant, extending out from center. Fill in each quadrant with tiles using a stair step technique.
6. Tip individual tiles into place to avoid catching pile in the joint. Frequently check tile joints for proper alignment and firm abutment.
7. Although tiles are nominally 24 inches by 24 inches square, there will be slight gain due to joints. To check, measure 10 installed tiles from edge to edge, spanning 10 joints. This measurement should be no greater than 240 and 1/8 inches for tufted product. If more gain is measured, tiles are not butted tightly enough. Reposition and check again. Use this method to continually check for excessive gain. See manufacturer's instructions for 24" x 24" modular tiles.
8. Fixtures, architectural elements, and perimeters will require tile cutting. Cut tiles from the back. Secure cut or partial tiles with adhesive.
9. Electrical floor outlets are usually wired after tile installation. Install tile over electrical boxes and mark locations with a piece of tape. Tiles can be lifted for cut-outs later.

10. Center trench headers directly under a full tile row.
11. In open perimeter designs, use a fixed reducer strip to secure the tile area.
12. Use an environmentally acceptable permanent adhesive for tiles installed on stairs. Compatible edge trim and nosing products may also be required.

3.03 CLEANING AND PROTECTION

- A. On completion of the installation in each area, all dirt, carpet scraps, etc., must be removed from the surface of the carpet. Any soiling spots or excessive adhesive on the carpet shall be removed with the proper spot remover. (See Section 1.3.7)
- B. Construction traffic other than as may be required to fit up specific carpeted area will not be allowed to traverse the completed work.
- C. Remove debris, and sort pieces to be saved from scraps to be redirected and recycled.
- D. Protect carpeting against damage during construction. Cover with 6-mil thick polyethylene covering with taped joints during the construction period, wherever protection is required, so that carpet will be without any indication of deterioration, wear, or damage at the time of acceptance. Damaged carpeting will be rejected and recycled. As the carpet is laid, remove all trimmings, excess pieces of carpet and laying materials.
- E. At the completion of the work and when directed by the Construction Manager, vacuum carpet using commercial dual motor vacuum of type recommended by carpet manufacturer. Remove spots and replace carpet where spots cannot be removed. Remove rejected carpeting and replace with new carpeting. Remove any protruding yarns with shears or sharp scissors.
- F. Protection of carpeting shall be maintained on each floor or area until accepted.

3.04 INSPECTION

- A. Preliminary Acceptance - Upon completion of the carpet installation of each floor, it shall be inspected by Owner, the Construction Manager and Trade Contractor.
- B. Upon completion of the installation, verify that work is complete, properly installed and acceptable. Remove and replace all work not found acceptable to the owner at the installer's expense.
- C. Upon completion of the installation the manufacturer shall deliver a certificate of recycling describing the method by which the uplifted carpet was recycled, and shall provide a promise of recycling specifying the method of recycling of the newly installed carpet tile at the end of its useful life.

END OF SECTION

SECTION 09 72 00

VINYL WALL COVERINGS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Wallcovering for fixed walls, including preparation of surfaces.
 - 1. Furnishing wallcovering for operable walls, and vinyl wrapped wall panels provided under other Sections.
- B. Related Work:
 - 1. Substrate materials
 - 2. Wall texturing
 - 3. Section 09 29 00 – Gypsum Board.
 - 4.

1.02 SUBMITTALS

- A. Samples: Provide 12-inch by 12-inch samples of selected wallcovering for review of quality, color, texture and weight. Provide from dye lots to be used on project only.
- B. Manufacturer's Instructions:
 - 1. Provide copies of maintenance instructions for wallcovering.
 - 2. Provide recommendation of cleaning materials and application methods, including precautions in use of cleaning materials which may be detrimental to surfaces if improperly applied.

1.03 QUALITY ASSURANCE

- A. Three full length panels of each type wallcovering to be used shall be installed in areas selected by Architect. Approved test panels shall be used as standard of quality of appearance and installation for Work.
 - 1. Test panels found deficient by Architect per specification standards or application shall be replaced.
- B. Conform to 2019 California Building Code, Title 24, Part 2, Chapter 8 and ASTM E112.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Store wallcovering in clean and dry area where temperatures are maintained at 55 degrees F. minimum, with normal humidity. Do not store in an upright position. Do not cross stack wallcovering.
- B. Take reasonable precautionary measures to prevent fire hazards with adhesives and solvents.
- C. Where toxic materials and both toxic and explosive solvents and adhesives are used, take appropriate precautions and provide proper ventilation.

1.05 PROJECT CONDITIONS

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- A. Environmental Requirements:
1. Maintain substrate surfaces and ambient temperatures above 60 degrees F. seven days before, during, and after application period.
 2. Ensure maximum surface moisture of substrate conforms to wallcovering manufacturer's requirements and does not exceed 5 percent. Surface shall exhibit negative alkalinity.
 3. Lighting: Provide a minimum of 80-foot candles per square feet on surfaces to be covered.
 4. Provide continuous and adequate ventilation during work and after installation of wallcovering.
 5. Install specified materials only when normal temperature and humidity conditions approximate the interior conditions that will exist when the building is occupied.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Vinyl wallcovering shall be the product of one manufacturer. Design is based on the use of products manufactured by the following:
1. Koroseal Interior Products Group, a Division of RJF International Corporation, Fairlawn, Ohio.
 2. Wallscape, East Brunswick, NJ, (866) 216 4483.
 3. Len-Tex Corporation, North Walpole, NH, (603) 445-2342.

2.02 MATERIALS

- A. Vinyl Fabric:
1. Vinyl-coated fabric shall comply with Federal Specifications CCC-W-408-A and with the CFFA-W-101-D Quality Standard for Vinyl Coated Fabric Wallcovering. Wall covering shall be Type II, with minimum weight of 20 ounces per lineal yard in 54-inch width. Wall covering shall be Class A rated, when tested in accordance with ASTM E84. Material shall have a flame spread rating of 25 or less, a fuel contributed rating of 10 or less and a smoke density rating of 450 or less.
 2. Classrooms: Fabric shall be Koroseal, as selected by Architect from the basic line or equal. Architect may select up to five different colors for the project.
 3. Performing Arts, Administration, and other spaces: Fabric shall be Koroseal, as selected by the Architect from the basic line, or equal. Architect may select up to five different colors for the project.

4. Engraving roller die marks, roller repeat marks, glossy surface appearance or other imperfections will be proper basis for TOTAL REJECTION by the Architect, if evidenced in either the submitted samples, or the manufactured materials supplied and delivered to the job.
- B. Primer and Adhesives: Provide manufacturer's recommended strippable types that allow for future removal of wall coverings without damage to substrate.
- C. Provide Owner with one can of adhesive and additional wall covering equal to 3 percent of each color used.
- D. Protective Coating: The vinyl wallcovering shall have a protective coating applied to its surface to minimize migration of stains into the vinyl and, therefore offer stain protection from a variety of staining agents and provide greater ease of cleanability.

2.03 SOURCE QUALITY CONTROL

- A. Tests: Perform in accordance with Federal Standard, FED-STD-191A, except as follows:
 1. Each roll of material delivered to the job site, must be affixed with U.L. labels, attesting to the maximum ratings specified herein, as determined by the ASTM E84 tunnel test.
 2. The vinyl wallcovering shall contain thermo-particulating ingredients, which when exposed to a direct heat of 300 degrees F., emits a colorless and odorless vapor that activates ionization type smoke detectors, when installed according to manufacturer's specifications.
Certified copies of ASTM E603 Standard Guide for Room Fire Experiments must be submitted to the Architect attesting to conformance of materials with this test.
 3. Toxicity shall be determined by the National Institute of Standards and Technology (NIST).
 4. Adhesive of vinyl coating to the fabric backing, shall be tested in accordance with ASTM D751.
 5. Resistance to strong cleaning solutions, shall be tested by immersing one-half of the material into a solution of 1% sodium hydroxide (NaOH) or a common cleanser, for a period of twenty-four (24) hours, then rinsed, dried and observed for possible discoloration.
 6. Materials shall have a zone inhibition rating of "0" to resist the growth of mildew and bacteria, as determined by test method ASTM G21.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine the areas and conditions under which wallcovering is to be installed and notify in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected in an approved manner.

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3.02 PREPARATION

- A. Remove wallcovering from packaging and allow acclimatizing to the area of installation 24-hours before application.
- B. Remove switchplates, wall plates, escutcheons, and surface-mounted fixtures, where wallcoverings are to be applied.
- C. Prime and seal substrates in accordance with the wallcovering manufacturer's printed recommendations for the type of substrate material to be covered.

3.03 INSTALLATION

- A. Place wallcovering panels consecutively in the order they are cut from rolls, including filling spaces above or below openings. Hang by reversing alternate strips except on match patterns.
- B. Apply adhesive to back of wallcovering and place in accordance with the manufacturer's printed instructions. Install seams vertically and plumb, and at least 6 inches away from corner; horizontal seams will be permitted only where specifically approved by Architect. Place wallcovering continuously over internal and external corners. Overlap seams and double cut to ensure tight closure. Roll, brush, or use a broad knife to remove air bubbles, wrinkles, blisters and other defects. Cut wallcovering evenly to the edges of openings.
- C. Trim selvages as required to ensure color uniformity and pattern match at seams.
- D. Remove excess adhesive along finished seams and clean well.
- E. Install the wallcovering with an intimate substrate bond, smooth; clean, without wrinkles, gaps and overlaps.
- F. Replace removed plates and fixtures to verify accuracy of concealment of cut edges.

3.04 CLEANING

- A. Upon completion of work, remove surplus materials, rubbish, and debris resulting from this material installation and leave area of work in a neat, clean condition.

3.05 WARRANTY

- A. Upon completion of work, contractor shall provide a written five (5) year warranty

END OF SECTION

SECTION 09 77 23

FABRIC- WRAPPED PANELS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Fabric and vinyl-wrapped panels on tackboard and fabric wrapped acoustical panels for walls including coordination with electrical and mechanical trades as indicated on the Drawings and specified herein.
- B. Related Sections:
 - 1. Section 09 29 00 – Gypsum Board: for walls and ceilings.
 - 2. Section 09 72 00 – Wall Coverings.
 - 3. Electrical work, Division 26.
 - 4. Mechanical work, Division 23.

1.02 SUBMITTALS

- A. Submit samples of fabric-wrapped materials and core for review.
- B. Provide Architect with Shop Drawings showing vertical joints, as well as details of panel attachment to substrates, and details at inside and outside corners.
 - 1. Describe materials, fabrics, adhesives, and mechanical fasteners or clips.
 - 2. Provide Certifications for Low-emitting materials.
- C. Submit certified test reports showing the acoustical properties as required in this Specification.

1.03 QUALITY ASSURANCE

- A. Ensure installation of these systems by persons thoroughly experienced with this type of installation and approved by the manufacturer of the systems being installed.
- B. Comply with requirements of Title 19 and Title 24, Part 2, California Building Code, 2019, Chapter 8.
- C. Acoustical measurements shall be performed in accordance with ASTM C423 performed in type A mounting per ASTM E795. The test shall be performed within the last 5 years by a laboratory accredited under the National Voluntary Laboratory Accredited Program for ASTM C423.
- D. Low-Emitting Materials: Provide tackable wallcovering that is third-party certified to have been tested and passed the following indoor air quality standard:
 - 1. Comply with the volatile organic compound emissions requirements of California Department of Public Health Standard Method, Section 01350.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver products and materials to the project and store in a safe, dry place with shop supplied protection and labeling intact and legible until set applied or installed.

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PART 2 - PRODUCTS

2.01 MATERIALS

- A. Vinyl Wrapped Panels: Provide wrapped-edge design panels with shop applied fabric finishes as scheduled by Architect and specified in Section 09 72 00 – Wall Coverings. Fabric shall not lap the back face more than 1-1/2" from edge.
 - 1. Core: Lamvin, Chatfield-Clarke, or equal - 1/2" fiberboard, noncombustible with flame spread less than 75, smoke density less than 450, ASTM E84. Fiber board ironed core 18lbs per cubic foot, Class C complying with ASTM C208, flame spread of 45 or less, and smoke density of 45.
 - 2. Fabric or Vinyl: As specified in Section 09 72 00, with flame spread of 25 or less.
- B. Minimum NRC of 0.70 for vinyl wrapped panels and 0.85 for fabric wrapped panels.

2.02 ACCESSORIES

- A. Acoustic Absorbing Panels Fabric: Class Flammability per ASTM E84. Guilford of Maine FR701®, Style 2100, or equal, pattern and color as selected by Architect.
- B. Fastening: Provide adhesive spread over entire contact surface with a 1/8-inch notched trowel or apply 1-inch dabs no more than 12 inches o.k. and 2 inches from edge of panel.
- C. Metal Trim: Where metal J-Trim is used, metal trim shall be clear anodized aluminum.
- D. Provide vinyl plastic 1/2-inch J-Bead Trim, as manufactured by Trim-Tex® Co. 3700 W. Pratt Ave. Lincolnwood, IL, 60712, or equal. Finish shall be glued on vinyl fabric to match wall panel finish. Install J-Bead Trim full height and where wall panels abut:
 - 1. Hard ceilings (gypsum board or plaster);
 - 2. At all dissimilar wall surfaces.
- E. Adhesives: Use adhesive to fasten fabric onto backing, per manufacturer's recommendations. Provide mildew-resistant, moisture-proof type which will not discolor or stain exposed surfaces of the fabrics.
 - 1. Apply adhesive to wall panel, full skim coat over the entire panel, level for an even, straight line appearance.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine building before beginning work to determine that it is properly enclosed, and the structure is in proper condition to receive installation.

3.02 INSTALLATION

- A. Prime subsurface with GL3210 Gripper Primer-Sealer, by Glidden, or equal as approved by adhesive manufacturer. Provide panel manufacturer approved adhesive over entire panel.
- B. Layout work in accordance with reviewed and approved shop drawings. Install panels

over entire area of scheduled walls including areas to be covered by casework.

- C. Install system as scheduled on the Drawings. Ensure that no fasteners are exposed.
 - D. Contiguous panels are to be in identical planes with no more than 1/8-inch variation in plane in 12-foot area.
 - E. Coordinate installation of vinyl wrapped panels with gypsum wall board installer, at walls where channel screed molding occurs.
- 3.03 CLEANING
- A. Clean surfaces, including floors and walls which have become soiled from this work.
 - B. Replace materials which have become broken, chipped or abraded.
- 3.04 WARRANTY
- A. Submit manufacturer's limited written warranty against manufacturing defects.
 - 1. Warranty Period: Five Years.

END OF SECTION

SECTION 09 84 13

FIXED SOUND-ABSORPTIVE PANELS

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide materials, labor and equipment necessary for the completion of acoustical panels as indicated on the Drawings and specified herein.
- B. Related Work:
 - 1. Section 09 90 00 – Painting and Coating.

1.02 SUBMITTALS

- A. Provide manufacturer's product literature to show compliance with requirements.

1.03 STORING AND HANDLING

- A. Deliver and store materials at job site in a safe area, out of traffic and shored up off ground surface.
- B. Do not store material outside. Do not deliver any material project until spaces or other surfaces to receive it are prepared.
- C. Protect products with adequate waterproofing.
- D. Exercise care in off-loading items to prevent damages, chips, splitting and breaking.

1.04 REFERENCES

- A. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.

PART 2 - PRODUCTS

2.01 SOUND-ABSORPTIVE PANELS

- A. Standard rigid fiberglass acoustical core panel, 6lb to 7lb density by Lamvin, Inc., 800.446.6329.
- B. High impact rigid Fiberglass acoustical core panel, 20lb density, by Lamvin, Inc., 800.446.6329.
- C. Fabric – Guilford of Maine, FR701, Style 2100, or equal, as shown on the drawings.
- D. Custom Fabric – Koroseal, or equal, as shown on the drawings.
- E. Flame spread rating: 25 or less in accordance with ASTM E84 test method.
- F. Panel Thickness: One inch.
- G. Butt Edges: Beveled.

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H. Panel Ends: (Architect to specify) Bevel, Radius, Mitered, Pencil Radius, or Square ends.

2.02 ADHESIVE

A. Contact Adhesive: As recommended by manufacturer.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install panels with adhesive, per manufacturer's recommendation. Provide 1/8" skim coat over entire back of panel.

B. Edges shall be clean and true. Chipped edges will not be acceptable.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Provide materials, labor and equipment necessary for the completion of a completely painted project, including preparation of painted surfaces. Provide finishes based on materials and products scheduled in these specifications and on the drawings. If not otherwise specified, provide prime coat and two finish coats on all exposed to view or weather surfaces. This shall include painting all pigmented exterior plaster (integral color stucco) in not less than three colors. The following miscellaneous items shall also be painted:
1. Areas shown to be painted on the Room Finish Schedule or Exterior and Interior Elevations. Items called out to be painted in Divisions 23 and Division 26. All hollow metal.
 2. Exposed site plumbing items, such as PIV's, backflow preventors, exposed pipes and standpipes, fire hydrants, irrigation air relief valve covers, exposed valves, exposed roof drainpipes, etc.
 3. Exposed interior mechanical ductwork, piping, and electrical conduits (except in electrical rooms and closets), wall and ceiling access covers, hatches, panel covers, and plates, and exposed cable tray and supports. **Roof top mechanical units that are above the height of the roof parapet, paint to match exterior plaster.**
 4. Priming and sealing of gypsum wallboard that is to receive vinyl wall covering.
 5. Roof hatches (interior and exterior), exterior galvanized ladders, sheet metal parapet copings on both sides and top. Exposed metal components that arrive on job with only prime finish. Signposts. Decorative metal fence and gates. Metal railings and bollards. Exposed steel connectors, bolts, and plates.
 6. Stain and seal exposed wood components.
- B. Specific items NOT to be painted or finished: Factory finished items (as opposed to factory primed), chain link fence, volleyball and basketball posts, football goals, chin-up bars, concrete benches, wood casework finished by casework fabricator.
- C. Related Work:
1. Section 32 12 16 – Asphalt Paving.
 2. Section 04 22 00 – Concrete Unit Masonry.
 3. Section 07 92 00 – Joint Sealants.
 4. Section 09 24 00 – Cement Plastering.
 5. Section 09 29 00 – Gypsum Board.
 6. Section 09 72 00 – Wall Coverings.
 7. Mechanical, Division 23.
 8. Electrical, Division 26.

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1.02 REFERENCE STANDARDS

- A. Conform to California Air Resources Board (CARB) Rules, especially 1113, Architectural Coatings.
- B. Title 19, California Code of Regulations (CCR), Public Safety, State Fire Marshal Regulations

1.03 SUBMITTALS

- A. Prepare eight, 8-1/2-inch by 11-inch samples of finishes, to be provided to District's Maintenance and Operations Department. When possible, apply finishes on identical type materials to which they will be applied on job.
- B. Identify each sample as to finish formula, color name, reflectance number and sheen name and gloss units.
- C. Colors will be selected by Owner and Architect prior to commencement of work, from manufacturer's full range of standard and custom colors.
- D. State Fire Marshal, Fire and Life Safety Approval: Flame retardant coatings shall be listed by the California State Fire Marshal's office. A copy of this listing and a material specification sheet shall accompany the submittal.
- E. Submittal to be reviewed and signed by District's Maintenance and Operations Department prior to Architects approval.

1.04 QUALITY ASSURANCE

- A. Mock-up: Before proceeding with paint application, finish one complete surface of each color scheme required, clearly indicating selected colors, finish texture, materials and workmanship. If approved, sample area will serve as a minimum standard for work throughout.

1.05 MAINTENANCE MATERIALS

- A. Leave on premises where directed, not less than one full gallon of each color, of each type of paint, in new unopened containers. Label each container for identification.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver paint materials in sealed original labeled containers bearing manufacturer's name, type of paint, brand name, solids content, color designation and instructions for mixing and/or reducing.
- B. Provide adequate storage facilities. Store paint materials at a minimum ambient temperature of 65 degrees F., in well ventilated area.
- C. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.07 PROJECT CONDITIONS

- A. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture contents of surfaces are below following minimums: gypsum board - 12 percent; cementitious materials - 12 percent.
- B. Ensure surface temperatures and surrounding temperatures are above 50 degrees F.,

before applying finishes.

- C. Provide adequate continuous ventilation and sufficient heating facilities to maintain temperatures above 50 degrees F., for 24 hours before, during, and 48 hours after application of finishes.
- D. During painting, provide minimum of 25-foot candles of lighting on surfaces to be painted.

1.08 EQUAL PRODUCTS

- A. All products specified herein, may be substituted with a product that is equal to better than the product specified. Products must be equal in all ways, including chemical and physical make up, as well as performance.
- B. Substitutions will be reviewed by the District and a determination will be made on the acceptability of the product submitted. If a determination is made that the substituted product is not equal, the original project specified herein will be provided at no cost to the owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Provide paints and coatings manufactured by one of the following companies noted in Section 2.02, D and referer to cross-reference guide for acceptable alternates.

2.02 PAINT MATERIALS

- A. Accessories: Provide linseed oil, turpentine and other materials not specifically specified but required to achieve finishes.
- B. Paints and Coatings: Provide ready-mixed type except field catalyzed coatings; pigments fully ground maintaining soft paste consistency, capable of being readily and uniformly dispersed to complete homogeneous mixtures.
- C. Provide paints and coatings with good flowing and brushing properties and capable of drying or curing free of streaks and sags.
- D. **Painting**
Provide equivalent paint types according to the following schedule.

Interior

New Drywall (Semi-Gloss Finish)

1 st coat	SW ProMar 200 Zero VOC Primer
2 nd coat	SW ProMar 200 Zero VOC Semi-Gloss
3 rd coat (to cover*)	SW ProMar 200 Zero VOC Semi-Gloss

New Drywall (Low Sheen Finish)

1 st coat	SW ProMar 200 Zero VOC Primer
2 nd coat	SW ProMar 200 Zero VOC Low-Sheen
3 rd coat (to cover*)	SW ProMar 200 Zero VOC Low-Sheen

New Drywall (Eggshell Finish)

1 st coat	SW ProMar 200 Zero VOC Primer
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2 nd coat	SW ProMar 200 Zero VOC Eg-shel
3 rd coat (to cover*)	SW ProMar 200 Zero VOC Eg-shel

New Drywall (Microbicidal Eggshell Finish – Locker Rooms, Nurses Office)

1 st coat	SW ProMar 200 Zero VOC Primer
2 nd coat	SW Paint Shield Microbicidal Eg-shel
3 rd coat (to cover*)	SW Paint Shield Microbicidal Eg-shel

New Wood Painted Surfaces (Semi-Gloss Finish)

1 st coat	SW Preprite ProBlock Primer
2 nd coat	SW ProIndustrial WB Alkyd Urethane Semi-Gloss
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Semi-Gloss

New Steel Door / Door and Window Frames

1 st step	GLL Clean & Etch
1 st coat	SW ProCryl Acrylic Metal Prime
2 nd coat	SW ProIndustrial WB Alkyd Urethane Semi-Gloss
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Semi-Gloss

New Ferrous Metal (including steel doors and hollow metal frames)

Pretreatment	GLL Clean & Etch
1 st coat	SW ProCryl Acrylic Metal Prime
2 nd coat	SW ProIndustrial WB Alkyd Urethane Semi-Gloss
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Semi-Gloss

New Galvanized Metal

Pretreatment	GLL Clean & Etch
1 st coat	SW ProCryl Acrylic Metal Prime
2 nd coat	SW ProIndustrial WB Alkyd Urethane Semi-Gloss
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Semi-Gloss

Ceilings

1 st coat	SW ProIndustrial WB Dryfall Flat
2 nd coat (to cover*)	SW ProIndustrial WB Dryfall Flat

Previously Painted Drywall and Wood “Wall” Surfaces (Semi-Gloss Finish)

1 st coat	SW Preprite ProBlock Primer
2 nd coat	SW ProMar 200 Zero VOC Semi-Gloss
3 rd coat (to cover*)	SW ProMar 200 Zero VOC Semi-Gloss

Previously Painted Drywall and Wood “Wall” Surfaces (Low Sheen Finish)

1 st coat	SW Preprite ProBlock Primer
2 nd coat	SW ProMar 200 Zero VOC Low-Sheen
3 rd coat (to cover*)	SW ProMar 200 Zero VOC Low-Sheen

Previously Painted Drywall and Wood “Wall” Surfaces – Locker Rooms, Nurses Office, Eggshell Finish)

1 st coat	SW Preprite ProBlock Primer
2 nd coat	SW Paint Shield Microbicidal Eg-shel
3 rd coat (to cover*)	SW Paint Shield Microbicidal Eg-shel

Previously Painted Wood Trim Surfaces (Semi-Gloss Finish)

1 st coat	SW Preprite ProBlock Primer
2 nd coat	SW ProIndustrial WB Alkyd Urethane Semi-Gloss
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Semi-Gloss

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Previously Painted Wood Trim Surfaces (Low Sheen Finish)

1 st coat	SW Preprite ProBlock Primer
2 nd coat	SW ProIndustrial WB Alkyd Urethane Low Sheen
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Low-Sheen

Previously Painted Metal Surfaces (Semi-Gloss Finish)

1 st coat (spot)	SW ProCryl Acrylic Metal Primer
2 nd coat	SW ProIndustrial WB Alkyd Urethane Semi-Gloss
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Semi-Gloss

Previously Painted Metal Surfaces (Low Sheen Finish)

1 st coat (spot)	SW ProCryl Acrylic Metal Prime
2 nd coat	SW ProIndustrial WB Alkyd Urethane Low-Sheen
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Low-Sheen

Vinyl Covered Walls

1 st coat	SW Extreme Bonding Primer
2 nd coat	SW ProMar 200 Zero VOC Semi-Gloss
3 rd coat (to cover*)	SW ProMar 200 Zero VOC Semi-Gloss

Exterior

New Painted Stucco-Plaster-Concrete (Low Sheen Finish)

1 st coat	SW Loxon Primer
2 nd coat	SW A-100 Satin
3 rd coat (to cover*)	SW A-100 Satin

New Painted Wood (Gloss Finish)

1 st coat	SW Preprite ProBlock Primer
2 nd coat	SW ProIndustrial WB Alkyd Urethane Gloss
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Gloss

New Painted Wood (Semi-Gloss Finish)

1 st coat	SW Preprite ProBlock Primer
2 nd coat	SW ProIndustrial WB Alkyd Urethane Semi-Gloss
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Semi-Gloss

New Painted Wood (Low Sheen Finish)

1 st coat	SW Preprite ProBlock Urethane
2 nd coat	SW A-100 Satin
3 rd coat (to cover*)	SW A-100 Satin

Previously Painted Stucco-Plaster-Concrete (Low Sheen Finish)

1 st coat	SW Preprite ProBlock Primer
2 nd coat	SW A-100 Satin
3 rd coat (to cover*)	SW A-100 Satin

Previously Painted Wood (Gloss Finish)

1 st coat	SW Preprite ProBlock Primer
2 nd coat	SW ProIndustrial WB Alkyd Urethane Gloss
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Gloss

Previously Painted Wood (Semi-Gloss Finish)

1 st coat	SW Preprite ProBlock Primer
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2 nd coat	SW ProIndustrial WB Alkyd Urethane Semi-Gloss
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Semi-Gloss

Previously Painted Wood (Low Sheen Finish)

1 st coat	SW Preprite ProBlock Primer
2 nd coat	SW A-100 Satin
3 rd coat (to cover*)	SW A-100 Satin

New Steel Doors / Door and Window Frames

1 st step	GLL Clean & Etch
1 st coat	SW ProCryl Acrylic Metal Primer
2 nd coat	SW ProIndustrial WB Alkyd Urethane Gloss
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Gloss

New Ferrous Metal

1 st step	GLL Clean & Etch
1 st coat	SW ProCryl Acrylic Metal Primer
2 nd coat	SW ProIndustrial WB Alkyd Urethane Gloss
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Gloss

New Galvanized Metal

Pretreatment	GLL Clean & Etch
1 st coat	SW ProCryl Acrylic Metal Primer
2 nd coat	SW ProIndustrial WB Alkyd Urethane Gloss
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Gloss

Previously Painted Steel Doors / Door and Window Frames

1 st coat	SW ProCryl Acrylic Metal Primer
2 nd coat	SW ProIndustrial WB Alkyd Urethane Gloss
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Gloss

Previously Painted Ferrous Metal

1 st coat	SW ProCryl Acrylic Metal Primer
2 nd coat	SW ProIndustrial WB Alkyd Urethane Gloss
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Gloss

Previously Painted Galvanized Metal

1 st coat	SW ProCryl Acrylic Metal Primer
2 nd coat	SW ProIndustrial WB Alkyd Urethane Gloss
3 rd coat (to cover*)	SW ProIndustrial WB Alkyd Urethane Gloss

- E. **SPECIAL COATINGS (HIGH PERFORMANCE)** – Exterior metal stairs (including handrails, railings and guard rails), roof sheet metal flashing, roof equipment, metal wall louvers and other metal surfaces requiring High Performance Coatings.

Unprimed or shop primed ferrous metal

1 st coat	SW Macropoxy 646
2 nd coat	SW Macropoxy 646
3 rd coat (to cover*)	SW High Solids Polyurethane

Galvanized or Aluminum

1 st coat	SW DTM Wash Primer
2 nd coat	SW Macropoxy 646
3 rd coat (to cover*)	SW High Solids Polyurethane

Previously Painted Metal

1 st coat	SW Macropoxy 646
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2 nd coat	SW Macropoxy 646
3 rd coat (to cover*)	SW High Solids Polyurethane

F. **Other** – Wood, metal and concrete steps and ramps attached to buildings indicated will be painted as follows:

Concrete Steps/Ramps

1 st coat	SW Armorseal 8100
2 nd coat (to cover*)	SW Armorseal 8100 w/ sand
3 rd coat	Include yellow stripes

Metal Steps/Ramps

1 st coat	SW Macropoxy 646
2 nd coat	SW Macropoxy 646
3 rd coat (to cover*)	SW High Solids Polyurethane w/ sand
4 th coat	Include yellow stripes

Wood Steps/Ramps

1 st coat	SW Superdeck 3100 Deck & Dock Elastomeric Coating
2 nd coat	SW Superdeck 3100 Deck & Dock Elastomeric Coating (6310 Anti-Skid added to 2 nd coat) Include yellow stripes

*“to cover” is defined – coverage must meet district’s approval

**“spot prime” is defined as priming all bare metal areas

G. **Fire Retardant Coating:** Must meet UBC No. 42-1. UL No. 723, ANSI - 2.5, NFPA 255, State Fire Marshal #C-10000, and ICBO No. 3656.

1. Flamort Flam-Gard clear fire-retardant varnish flame spread less than 75, a clear intumescent fire-protective interior varnish for natural wood finishes. Apply two coats, base coat, 8 gallons per coat per 1000 square feet and one coat, finish coat, 2-1/2 gallons per 1000 square feet. As manufactured by Flamort Company.
2. GLIDDEN: Contact Flame Control Coatings (see attached information).
3. Dunn-Edwards Corp.
4. Frazee Paint Co.

Note: Provide 12" x 12" samples of each of the systems listed in AD. Fire Retardant Coating above, and Architect will select system to be used, based on finish achieved.

5. Vista Paint: Clear or Fire-Retardant Intumescent Paint. For use on exterior wood surfaces requiring weather protection. Clear product is used over interior surfaces on wood and paneling where natural finish is required.

H. **Anti-Graffiti Coating**

1. Preferred Product: Surpro HDWB: by Surtec, Inc., Surface Technology, 1880 N. MacArthur Drive, Tracy, CA 95376, Phone: (209) 820-3700.
2. VandIGuard™: by Rainguard International, 1079 Culpepper Drive, Conyers, GA,

I. **Paint Guide**

SURFACES	FRAZEE
Interior	126 Aro-Thane S/G
Interior	129 Aro-Thane L/S
Interior	022 LoGlo
Exterior	215 Royal Supreme
Exterior	146 Aro-Thane Gloss
Exterior	136 Aro-Thane S/G

J. **Primer Guide**

SURFACES	FRAZEE
Interior – New Gypsum Board	Zinsser 123 Primer/Sealer
Interior – New Wood	Zinsser 123 Primer/Sealer
Interior – New Metal Surfaces	C309 Universal Metal Primer
Interior – Previously Painted Gyp Board, Wood	Zinsser 123 Primer/Sealer
Interior – Previously Painted Plaster, Metal	Zinsser 123 Primer/Sealer
Exterior – New and Previously Painted Wood	Zinsser 123 Primer/Sealer
Exterior – New and Previously Painted Stucco, Concrete, and Plaster	Zinsser 123 Primer/Sealer
Exterior – New and Previously Painted Metal	Zinsser 123 Primer/Sealer

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Thoroughly examine surfaces scheduled to be painted prior to commencement of work. Report in writing of conditions potentially detrimental to proper application. Do not commence until satisfied that defects and deficiencies in surfaces have been rectified.

3.02 PROTECTION

- A. Adequately protect other surfaces from paint and damages. Repair damages as a result of inadequate or unsuitable protection.

- B. Furnish sufficient drop cloths, shields and protective equipment to prevent spray or droppings from fouling surfaces not being painted and in particular, surfaces within storage and preparation areas.
- C. Place cotton waste cloths and materials which may constitute a fire hazard in closed metal containers and remove daily from site.
- D. Remove or cause to have removed, electrical plates, fittings, fastenings, escutcheons, and hardware prior to painting operations. These items are to be carefully stored, cleaned and replaced on completion of work in each area. Do not use solvents or other harsh cleansers on surfaces which could be damaged by such use of materials.

3.03 PREPARATION OF SURFACES

- A. Thoroughly clean surfaces to be painted with hydro-cleaning process to remove chalk, dirt and other deleterious materials where such cleaning methods are practical. Spot prime before application of finish coats.
- B. Remove dirt, grease and oil from canvas and cotton covered insulated materials such as pipes and ducts.
- C. On surfaces to be cleaned which cannot be hydro cleaned, where possible, wash with solution of TSP and thoroughly rinse.
- D. Patch and prime cementitious materials.
- E. Remove contamination from gypsum board surfaces and prime to conceal defects. Paint after defects have been remedied.
- F. Remove surface contamination and oils from zinc coated/galvanized surfaces, wash with solvent, apply etching primer or as recommended by paint manufacturer and confirmed with metal manufacturer.
- G. Remove dirt, loose scale, powder, mortar and other foreign matter from cementitious surfaces which are to be painted or to receive sealer. Remove oil and grease with TSP solution, rinse well and allow to thoroughly dry.
- H. Remove stains from cementitious surfaces caused by weathering of corroding materials with a solution of sodium metasilicate after being thoroughly wetted with water. Allow to thoroughly dry.
- I. Fill hairline cracks, small holes and imperfections. Smooth off to match adjacent surfaces. Smooth off to match adjacent surfaces. Wash and neutralize high alkali where they occur.
- J. Remove grease, rust, scale, dirt and dust from steel and iron surfaces. Where heavy coatings of scale are evident, remove by wire brushing, sandblasting or other method necessary, practical and in accordance with Steel Structures Painting Council.
- K. Clean non-primed steel surfaces by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring welded joints, bolts and nuts are similarly cleaned. Prime surfaces to indicate defects. Paint after defects have been remedied.
- L. Sand and scrape shop primed steel surfaces to remove loose primer, and rust. Feather out edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime

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bare surfaces.

- M. Wipe off sanding dust and grit from miscellaneous wood and carpentry items prior to priming. Spot coat knots, pitch steaks and sappy sections with sealer. Fill nail holes and cracks after primer has dried and sand between coats. Back prime interior and exterior woodwork.
- N. Doors:
 - 1. Painting Contractor shall not remove or reinstall any door hardware.
 - 2. Except for door hinges, painting of doors must be completed prior to installation of hardware.

3.04 APPLICATIONS

- A. Apply each coat at proper consistency.
- B. Each coat of paint is to be slightly darker than preceding coat unless otherwise directed, or finish is clear.
- C. Sand lightly between coats to achieve required finish.
- D. Do not apply finishes on surfaces that are not sufficiently dry.
- E. Allow each coat to dry before following coats are applied.
- F. Backprime wood which is to receive paint or enamel paint, with enamel undercoater paint.
- G. Prime top and bottom edges of wood doors with enamel undercoater when they are to be painted.
- H. Apply flame retardant coating to the wood surface prior to applying stain and/or paint per manufacturer's instructions. Furnish certification of application of flame-retardant coating.

3.05 MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Refer to mechanical and electrical sections of these specifications, as well as Drawings, with respect to painting and finishing requirements, color coding, identification banding of equipment, ductwork, piping and conduit.
- B. Remove grilles, covers and access panels for mechanical and electrical systems from location and paint separately.
- C. Finish paint primed equipment to colors selected.
- D. Prime and paint insulated and bare pipes, conduits, boxes, insulated and bare ducts, hangers, brackets, collars and supports, except where items are plated or covered with a pre-finished coating, or are not exposed-to-view.
- E. Replace identification markings on mechanical and electrical equipment when painted over or spattered.
- F. Paint interior surfaces of air ducts, convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint, to limit of sightline.

Paint dampers exposed immediately behind louvers, grilles, convector and baseboard cabinets to match face panels, as applicable.

- G. Paint both sides and edges of plywood backboards for electrical equipment before installing backboards and mounting equipment on them.
 - H. Color code equipment, piping, conduit, and exposed ductwork of mechanical and electrical work. Color banding and identification shall include flow arrows, naming, numbering, stenciling, etc.
- 3.06 CLEANING
- A. As work progresses and upon completion, promptly remove paint where spilled, splashed, smeared and splattered.
 - B. During progress of work, keep premises free from unnecessary accumulations of tools, equipment, surplus materials and debris.
 - C. Upon completion of work, leave premises neat and clean, to satisfaction of Owner.

END OF SECTION

10 00 00

SPECIALTIES

LAKESIDE UNION SCHOOL DISTRICT

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:
- 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.
 - Character Size: Raised characters shall be a minimum of 5/8-inch (15.9mm) and a maximum of 2 inches (51 mm) high.
 - 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.
 - 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.
- 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 9"x9" 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.

- D. Site Signs

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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 20 00

INTERIOR SPECIALTIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Ceiling and soffit access doors, cubicle track and curtains, attic access doors, and as indicated on the Drawings and specified herein.
- B. Related Sections:
 - 1. Section 06 10 00 – Rough Carpentry.
 - 2. Section 09 24 00 – Cement Plastering.
 - 3. Section 09 29 00 – Gypsum Board.
 - 4. Section 09 51 00 – Acoustical Ceilings.
 - 5. Section 09 90 00 – Painting and Coating.

1.02 SUBMITTALS

- A. Provide material list of items proposed to be provided.
- B. Submit data sufficient to demonstrate compliance with specifications and drawing requirements.
- C. Submit shop drawing and catalog cuts of items to be provided. Manufacturer or producer's standard drawings and technical information may be acceptable where complete enough to determine acceptability.
- D. Submit samples of products and materials where options of color, finish, pattern, or texture exist.

1.03 QUALITY ASSURANCE

- A. Products and materials to be provided are to be from manufacturers and producers regularly engaged full-time in the manufacture of production of this and similar items, with a history of successful manufacture or production acceptable to the Owner.
- B. In addition to complying with pertinent codes and regulations, comply with industry and trade standards normally associated with this product or material, except where specified product or material is superior in quality to industry and trade standards.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver products and materials to the project; and store in a safe, dry place with shop-supplied protection and labeling intact and legible until set, applied or installed.
- B. Use reasonable means necessary to protect products and materials before, during, and after installation.
- C. In event of damage, regardless of responsibility and culpability, make repairs and replacements necessary to satisfaction of Owner, and at no additional cost to Owner.

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1.05 WARRANTY

- A. Provide Owner with a warranty as a condition of work acceptance, signed by Contractor and installer (where applicable), agreeing to maintain, repair and/or replace products and materials for one year following Notice of Completion, and without additional cost to Owner, as specified in Section 01 78 30 – Warranties, Guarantees, and Bonds.

PART 2 - PRODUCTS

2.01 CURTAIN TRACK

- A. Construction Specialties, Inc., 1-3/8" wide x 3/4" deep dual channel extruded heavy clear anodized aluminum alloy (6063-T4), or White baked enamel Polycron/Duracon paint finish, meeting or exceeding the requirements of AAMA603. Submit sample of both, for architect selection.
1. Carrier: Nylon frame and rollers with nickel plated bead chain and hook, IFC Model 100. Provide 1 for each 6" of cubicle curtain width.
 2. End fittings: For each end and snap-out fitting at one end.
 3. Splicer: For joining track.
- B. Curtain: Submit a flame-retardant certificate for curtains complying with the requirements of Section 3.08, Title 19, California Code of Regulations.
1. Fabric: Provide cubicle curtain fabrics with the following characteristics:
 - a. Fabrics shall be launderable to temperature of not less than 160 degrees F ((71 Deg C).
 - b. Fabrics are flame resistant and are identical to those that have passed NFPA 701 when tested by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify fabrics with appropriate markings of applicable testing and inspecting agency.
 - c. Fiber Content: 100% FR Polyester integrated solid mesh.
 - d. Color: To be selected by architect from manufacturer's full range of colors.
 2. Curtain top: Not less than 20" (510 mm) wide nylon mesh with 1/2" (13 mm) holes. Overlap seams and double-lock stitch to body of curtain.
 3. Provide curtains fabricated to comply with the following requirements:
 - a. Width: Equal to track length from which curtain is hung plus 10 percent, but not less than 12" (300 mm).
 - b. Length: Equal to floor-to-ceiling height minus 20" from finished ceiling at top and 12"-15" above finished floor.
 - c. Top Hem: Not less than 1" (26 mm) and not more than 1-1/2" (40 mm) wide, triple thickness, reinforced with integral web and double stitched.

- d. Grommets: 2 piece, rolled-edge, rustproof, nickel-plated brass and spaced not more than 6" (150 mm) o.c.
- e. Bottom and Side Hems: Not less than 1" (25 mm) wide, reinforced, triple thickness and single stitched.
- f. Seams: Not less than 1/2" (13 mm) wide, double turned and double stitched.

4. Curtain Tieback: At each termination.

2.02 CEILING /SOFFIT ACCESS DOORS

- A. As manufactured by Milcor, or other approved equal.
- B. Attic access openings shall be provided where shown on Drawings with following type doors:

Type A: For Installation in interior Gypsum Board Ceiling or Wall:

Style DW, Model No. 3203-018, 22" x 22". Prime painted with rust inhibitive paint, 16-gauge steel frame, and 14-gauge door. Provide one (1) key-operated cylinder lock (2 keys) per door. Finish paint to match ceiling, wall, or soffit, unless otherwise directed on the plans and specifications.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install miscellaneous specialty items in accordance with shop and installation drawings, and in compliance with written instructions from manufacturer.

END OF SECTION

SECTION 10 21 13.19

PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Floor mounted solid plastic toilet partitions with overhead brace, wall hung urinal screens, fasteners, hardware, reinforcing for grab bars, and necessary cutouts for scheduled toilet accessories as indicated on the Drawings and specified herein.
- B. Related Sections:
 - 1. Section 05 40 00 – Cold-Formed Metal Framing.
 - 2. Section 06 10 00 – Rough Carpentry: for blocking.
 - 3. Section 10 28 13 – Toilet Accessories.

1.02 REFERENCES

- A. American Society for Testing and Materials.
 - 1. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - 2. ASTM B221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
 - 3. ASTM D1929 - Determining Ignition Temperature of Plastics.
 - 4. ASTM D635 - Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
 - 5. ASTM D2843 - Density of Smoke from the Burning or Decomposition of Plastics.

1.03 SUBMITTALS

- A. Samples:
 - 1. Submit sample of partition material cut in half, illustrating inner material, finish, color and sheen.
 - 2. Manufacturer's color samples
 - 3. Submit samples of door latch, and wall bracket and hinge assembly.
 - 4. Recycled materials certification.
- B. Shop Drawings:
 - 1. Indicate partition plan, elevation views, dimensions, panel and door sizes, details of wall, floor supports and door swings.

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2. Show anchorage, accessory items and finishes.
3. Provide location drawings for bolt hole locations in supporting members for attachment of partitions.

C. Manufacturer's Data:

1. Data sheets on panel construction, hardware and accessories.
2. Installation instructions
3. Maintenance procedures

1.04 REGULATORY REQUIREMENTS

A. Materials shall conform to CBC 2016, Chapter 8.

B. ASTM Test Standards Results:

<u>Property</u>	<u>Value</u>	<u>Units</u>	<u>ASTM Method</u>
Self Ignition	650F.	700F.	D1929 -12
Rate of Burn	2.0 cm/min.	1.29 cm/min	D635 -10
Smoke Density	<75	13.9	D2843 -10
Flame Spread	<200 ft./min.		

C. Require independent party to perform fire rating testing in accordance with ASTM E84.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver items in manufacturer's original unopened protective packaging.

B. Store materials in original protective packaging to prevent soiling, physical damage, or wetting.

C. Handle so as to prevent damage to finished surfaces.

1.06 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.07 WARRANTY

A. Provide manufacturer's standard 25-year warranty, to include breakage, corrosion or delamination of installed plastic components and door latch/strike system. Defective components shall be replaced. Warranty to be provided as specified in Section 01 78 30 – Warranties, Guarantees, and Bonds

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Toilet Partitions and screens to be Hiny Hinders as manufactured by Scranton Products (Santana/Comtec/Capitol), Scranton, PA 18505, (800) 445-5148, Legacy Polymer Products, Inc., Dunmore, PA 18512, (888) 344-5698, or equal.

2.02 MATERIALS

- A. Partitions, Stiles, Screens and Doors: Color to be selected by Architect.
1. Toilet partitions shall be floor mounted, head braced, with matching panels, doors and pilaster. Urinal screens shall be wall mounted, floor braced.
 2. Panels, doors and pilasters shall be solid high-density polyethylene (HDPE) containing a minimum of 70% recycled resin manufactured under high pressure; forming a single component section which is waterproof, non-absorbent and has a self-lubricating surface that resists marking with pens, pencils or other writing utensils. Engineered Plastic shall not be accepted. Panels, doors and pilasters to arrive at job site with special protective plastic covering. All finishes shall be tested in accordance with NFPA 286 and comply with CBC Section 803.1.1.1. All finish shall be tested in accordance with ASTM E84 or UL 723 and comply with Class A, flame spread index 0-2 and smoke developed index 0-450.
 3. Environmental Option: Panels, doors and pilasters shall be solid high-density polyethylene (HDPE) containing a minimum of 100% recycled resin manufactured under high pressure; forming a single component section which is waterproof, non-absorbent and has a self-lubricating surface that resists marking with pens, pencils or other writing utensils. Panels, doors and pilasters to arrive at job site with special protective plastic covering.

2.03 COMPONENTS

- A. Toilet Compartments: Accessible toilet stalls shall have slide bolt latch, "U-shaped" pulls at both sides of the door and self-closing hinges. Door hardware shall be mounted at 30" to 44" above finish floor surface. Coat hook at +48" above finish floor where provided.
- B. Pilaster Shoe: Formed one-piece plastic with a stainless-steel tamper resistant torx head sex bolt.
- C. Head Rail: ASTM B221; aluminum extrusion, 6463-T5 alloy with clear anodized finish and anti-grip configuration, weighing a minimum of 1.188 lbs. per lineal foot.
- D. Attachments, Screws, and Bolts: ASTM A167; Type 304 stainless steel.
- E. Through Bolts and Nuts: Type 304 stainless steel, Anti-theft type.
- F. Hardware:
1. Hinges: 8" heavy duty extruded aluminum (G465-TS Alloy) wrap around hinges.
 2. Door Latch Housing: Aluminum extrusion with clear anodized finish, surface mounted and fastened to door with stainless steel anti-theft torx one-way screws. Slide bolt and button shall be Black anodized finish. Slide bolt latch at accessible compartments 30" - 44" above finish floor with stainless steel anti-theft torx one-way screws.
 3. Keeper: 6 inches long heavy-duty extruded aluminum with anodized finish, surface mounted, fastened to pilaster in alignment with door latch with stainless steel anti-theft one-way screws.
 4. Equip each door with sliding door latch mounted 30" to 44" above finish floor, and coat hook of heavy chrome plated Zamack with rubber bumper mounted 48

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inches maximum, above finish floor.

5. Provide door pull and wall stop for out-swinging doors. Equip doors accessible to disabled persons doors with inside and outside U-shaped pulls mounted 30" to 44" above finished floor. Doors shall be self-closing.
 - a. Door at front entry stalls shall have 32-inches minimum clear width when the door is open 90 degrees.
 - b. Doors at side entry stalls shall have 34-inches minimum clear width when the door is open 90 degrees.
6. Wall Brackets: 54 inches long continuous plastic brackets.
7. Pilaster Brackets: 54 inches long continuous plastic brackets.

Full length continuous wall brackets shall be used for panels to pilaster, pilaster to wall, screen to wall, and panel to wall connections. Wall brackets shall be pre-drilled by manufacturer with holes spaced every 6 inches along full length of brackets. Wall brackets shall be thru-bolted to panels and pilasters with one-way sex bolts. Attachment of brackets to adjacent wall construction shall be accomplished by (1) theft-proof screw in head anchor directly behind the vertical edge of panels and pilasters at every 12 inches along the full length of bracket and No. 5 plastic anchors and No. 14 x 1-1/4" stainless steel tamper resistant torx security screws at each 12 inch interval alternately spaced between anchor connections.

8. Pilaster shoes shall be the same material as the partitions.

2.04 ACCESSIBLE TOILET COMPARTMENT:

- A. Wheelchair accessible compartment shall comply with CBC Section 11B-604.8.1.
- B. Toe clearance for at least one side partition of a wheelchair accessible compartment shall comply with CBC Section and Figure 11B-604.8.1.2. It shall be 9" high minimum above the finish floor and 6" deep minimum beyond the compartment side face of the partition, exclusive of partition support members. It shall be 2" high minimum above the finish floor for children's use. Partition components at toe clearances shall be smooth without sharp edges or abrasive surfaces. Toe clearance at the side partition is not required in a compartment greater than 66" wide.
- C. Door and door hardware for accessible compartment shall be self-closing and shall comply with CBC Section 11B-404'
- D. Door pull complying with CBC Section 11B-404.2.7 shall be placed on both dies of the accessible compartment door near the latch.

2.05 FABRICATION

- A. Fabricate partitions from HDPE material with finished faces, free of saw marks, and all edges machined to .250-inch radius.
- B. Bevel corners and edges of cutouts.
- C. Typical Doors, Panels and Pilasters:

1. Thickness: 1 inch.
2. Door Width: 24 inches minimum.
3. Door Width for Physically Disabled use: 36 inches.
4. Door Height: 55 inches.
5. Pilaster Height: 82 inches.
6. Panel Height: 55 inches, mounted 14 inches above finish floor.
7. Aluminum edging strips to be fastened to the bottom edge of all doors and panels using anti-theft fasteners.

D. Urinal Screens:

1. Thickness: 1 inch.
2. Screen Width: 24 inches minimum.
3. Screen Height: 42 inches mounted 14 inches above finished floor.
4. Aluminum edging strips to be fastened to the bottom edge of all screens using anti-theft fasteners.
5. Floor Supported Pilasters: 3" high pilaster shoes formed from one-piece plastic with a stainless-steel tamper resistant torx head sex bolt.

2.06 FINISHING

- A. Color of solid HDPE: to be selected by Architect.
- B. Stainless Steel Surfaces: No. 4, satin finish.
- C. Aluminum: Anodized, clear natural color.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Check areas scheduled to receive partitions for correct dimensions, plumbness of walls and soundness of surfaces that would affect installation of holding brackets. Verify correct location of built-in framing, anchorage, and backing.
- B. Verify spacing of plumbing fixtures to assure compatibility with installation of partitions.
- C. Do not begin installation of partitions until conditions are satisfactory.
- D. Wheelchair accessible toilet compartment shall have:
 1. Self-closing door hinges.
 2. Slide bolt door latch, U-shaped or wire pulls both sides of the door shall be located directly beneath the latch and self-closing hinges. Door hardware shall be mounted

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at 30" to 44" above finished floor.

3. Coat hook at maximum 48-inches above finish floor.
4. Front Entry Doors: Stalls have 32" minimum clear width when the door is open 90 degrees.
5. Side Entry Doors: Stalls shall have 34" minimum clear width when the door is open 90 degrees.

3.02 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Attach continuous wall brackets securely to walls using stainless steel fasteners spaced maximum 12 inches on center.
- C. Attach panels to wall brackets with stainless steel one-way sex bolts.
- D. Attach panels to pilasters with continuous brackets fastened with anti-theft stainless steel screws.
- E. Locate head rail joints at pilaster center lines and use end caps on exposed ends.
- F. Shoes anchored to floor with 1-1/2-inch #14 screws and plastic anchors. Pilaster secured within shoe with anti-theft stainless steel screws.
- G. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 ADJUSTING

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16-inch.
- B. Adjust hinges to close doors when unlatched.
- C. Set hinges on outward swing doors for the physically disabled accessible compartments to hold doors in closed position when unlatched.

3.04 CLEANING

- A. Clean exposed surfaces of partitions, hardware, fittings, and accessories.
- B. All surfaces shall be free of imperfections, scratch marks, blemishes or color variations.
- C. Remove and replace any components indicating evidence of imperfections.

END OF SECTION 10 21 13.19

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

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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. NOT USED
- 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

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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 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

SECTION 10 44 00

FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Fire extinguishers and fire extinguisher cabinets as indicated on the Drawings and specified herein.
- B. Related Work:
 - 1. Section 05 40 00 – Cold-Formed Metal Framing.
 - 2. Section 06 10 00 – Rough Carpentry.
 - 3. Section 09 24 00 – Cement Plastering.
 - 4. Section 09 29 00 – Gypsum Board.
 - 5. Division 21 – Fire Suppression.

1.02 SUBMITTALS

- A. Provide materials list of items proposed to be provided.
- B. Submit data sufficient to demonstrate compliance with specifications and drawing requirements.
- C. Submit shop drawing and catalog cuts of items to be provided. Manufacturer or producer's standard drawings and technical information may be acceptable where complete enough to determine acceptability.
- D. Submit samples of products and materials where options of color, finish, pattern, or texture exist.

1.03 QUALITY ASSURANCE

- A. Products and materials to be provided are to be from manufacturers and producers regularly engaged full-time in the manufacture or production of this and similar items, with a history of successful manufacture or production acceptable to the Owner.
- B. In addition to complying with pertinent codes and regulations, comply with industry and trade standards normally associated with this product or material, except where specified product or material is superior in quality to industry and trade standards.
- C. Comply with the requirements of Chapter 3, Title 19, California Code of Regulations (CCR), and California Building Code (CBC) Title 24, Sections 11B-205 and 11B, Division 3.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver products and materials to the project and store in a safe, dry place with shop-supplied protection and labeling intact and legible until set, applied, or installed.
- B. Use reasonable means necessary to protect products and materials before, during, and after installation.

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- C. In event of damage, regardless of responsibility and culpability, make repairs and replacements necessary to satisfaction of Owner, and at no additional cost to Owner.

1.05 WARRANTY

- A. Provide Owner with a written warranty as a condition of work acceptance, signed by Contractor and Installer (where applicable), agreeing to maintain, repair and/or replace products and materials for one year following acceptance, and without additional cost to Owner, as specified in Section 01 78 30 – Warranties, Guarantees, and Bonds.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Fire Extinguisher Cabinets: Larsen's Manufacturing Company, Model SS-2409-R1-FG (Model FS-SS-2409-R1-FG at rated walls, see floor plan for 1-hour rated walls), recessed cabinet or equal by Potter-Roemer or JL Industries by Activar, Inc. Full clear acrylic door with Larsen-Loc® (clear anodized aluminum) trim and door. Provide pressure sensitive decals or paint red letters, 1-inch high, reading:

FIRE EXTINGUISHER

Small instruction letters reading:

"IN CASE OF FIRE ONLY - PULL FIRMLY ON HANDLE".

Equip door with keyed-alike Yale tumbler locks with trip-bar-release inside.

- B. Extinguishers: 5 lb., Tri-Class, dry chemical by Larsen's Manufacturing Company, enameled steel extinguishers. Extinguishers shall be Model MP5 2A-10B:C or equal by Potter-Roemer or JL Industries, UL rated, conforming to the requirements of California Code of Regulations, Title 19, Division 1, Chapter 3 and California Fire Code, Title 24, Part 9, Section 906.
- C. Where indicated, at Custodial, Mechanical and Electric Rooms, provide surface mounted bracket with retainer straps. Larsen's Model 846 or equal.
- D. Fire Blanket Cabinet with Fire Blanket: Larson FB 68-6 or other approved equal, equipped with 62" x 80" fire blanket, fabricated from wool and man-made fibers and treated with fire resistant chemical.

2.02 VERIFICATION OF PERFORMANCE

- A. Fire extinguisher cabinets latching and locking hardware to be operable with a single effort by lever-type hardware, panic bars, push-pull activating bars or other hardware designed so as not to require the ability to grasp the opening hardware and not require a force greater than 5 lbs. (22.2 N) to open. Force required to activate controls shall not exceed 5 lbs.
- B. Cabinets shall be recessed or semi-recessed in order not to protrude more than 4 inches (102 mm) from face of wall, mounted between 15-48 inches (381-1,219 mm) above finish floor for forward approach, and mounted between 9-54 inches (229-1,372 mm) above finish floor for side approach.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install equipment in strict accordance with manufacturer's instructions.
- B. Install fire extinguisher cabinet so that fire extinguisher handle is not more than 48 inches above finished floor.

3.02 CLEANING

- A. Keep areas clean during entire operation and leave spaces broom clean.
- B. After completion, clean up and remove resultant debris from the site.

END OF SECTION

11 00 00

EQUIPMENT

LAKESIDE UNION SCHOOL DISTRICT

SECTION 11 40 00

FOOD SERVICE EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

- A. Provisions of the General Conditions, Supplementary Conditions and Division 1 – General Requirements, apply to this Section.
- B. Section Includes:
 - 1. Food Service Equipment, including storage, preparation and serving equipment, as indicated on the Food Service Consultant's drawings and in PART 4 - FOOD SERVICE EQUIPMENT, herein. The Food Service Equipment drawings form part of these specifications.
 - 2. Stainless steel fabrications, including countertops, cabinetry and corner guards
 - 3. Plumbing, including faucets, drains and fittings for sinks built into Food Service Equipment
 - 4. Exhaust Hoods and related Ventilation
 - 5. Exhaust Hood Wet Fire Suppression System
 - 6. Walk-in Cooler and Freezer
- C. Related Sections:
 - 1. Division 1 Section - Product Requirements: Conditions for acceptance of products by manufacturers and for substitutions. Unless specifically noted, no substitutions will be considered
 - 2. Division 1 Section - Warranty
 - 3. Division 3 Section - Concrete Work: Concrete curbs, pads and depressions
 - 4. Division 5 Section - Metal Fabrications: Metal supports and anchors to concrete and masonry
 - 5. Division 7 Section - Joint Sealers/Sealants: Joint sealing for weather tightness, waterproofing and acoustical seals
 - 6. Divisions 21-23 Section – Basic Mechanical Requirements: General requirements, in addition to those specified, as applicable to plumbing, fire protection and ventilating work associated with food service equipment
 - 7. Divisions 22-23 Section - Supports, Anchors and Seals: General requirements for supports and anchors for pipe and duct systems associated with food service equipment
 - 8. Division 26 Section – Basic Electrical Requirements: General requirements, in addition to those specified, as applicable to electrical work associated with food service equipment

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1.02 QUALITY ASSURANCE

- A. Manufacturers' Qualifications: Firms shall have been regularly engaged in the manufacture of Food Service Equipment of the types, capacities, and sizes required, whose products have been in satisfactory use in similar service for no fewer than five (5) projects.
- B. Installer's Qualifications: Installer shall have completed no fewer than five (5) Food Service Installations similar in material, design, and extent to that indicated for this Project, which have resulted in satisfactory in-service performance.
- C. Codes and Standards:
 - 1. NSF Standards: Comply with applicable National Sanitation Foundation (NSF) standards and recommended criteria including NSF-2 and NSF-7. Provide each principal item of Food Service Equipment with an NSF Seal of Approval.
 - 2. UL Labels: Provide Underwriters Laboratories, Inc. (UL) labels on prime electrical components of Food Service Equipment. Provide UL "recognized marking" on other items with electrical components, signifying listing by UL, where available.
 - 3. ANSI Standards: Comply with applicable American National Standards Institute (ANSI) standards for electric-powered and gas-burning appliances, for piping to compressed-gas cylinders, and for plumbing fittings including vacuum breakers and air gaps to prevent siphonage in water piping
 - 4. NFPA Codes: Install Food Service Equipment in accordance with the following National Fire Protection Association (NFPA) codes:
 - a. NFPA 54 - National Fuel Gas Code
 - b. NFPA 70 - National Electrical Code
 - c. NFPA 96 - Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment
 - 5. ASME Boiler Code: Construct steam-generating and closed steam-heating equipment to comply with American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code; Section IV for units not exceeding 15 psi or 250°F, or Section I for higher pressure/temperature units
 - 6. Refrigeration: Use current refrigeration on all self-contained and remote refrigerated items including, but not limited to, walk-ins, ice machines, refrigerators and freezers. The refrigerant shall be current, new (not recycled), and readily available for a minimum of ten (10) years. For further clarification refer to PART 2.06 - REFRIGERATION EQUIPMENT, herein.
 - 7. Accessibility:
 - a. Food service equipment required to be accessible shall conform to all reach requirements (for Clear floor or ground space, Forward reach, and Side reach).

- b. Where provided, check-out aisles, sales counters, services counters, food service lines, queues, and waiting lines shall comply with **CBC Section 11B-227 and 11B-904**
 - c. Food service aisle shall be a minimum of 36 inches wide and the top of tray slides shall be 28 inches minimum and 34 inches maximum above the finish floor.
 - d. Walk-in coolers and freezers shall have level maneuvering clearances at the exterior side and accessible entry and exit door hardware.
 - e. Space and elements within food service employee work areas shall meet the requirements of **CBC Section 11B-203.9** only.
8. Guidelines for Seismic Restraint of kitchen equipment as published by SMACNA.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver Food Service Equipment in containers designed to protect the equipment and finish until installation. Make arrangements to receive equipment, when required, at the project site or to hold in a warehouse until delivery can be made to the job site.
- B. Storage: Store Food Service Equipment in the original containers and in a location to provide adequate protection to equipment while not interfering with other construction operations.
- C. Handling: Handle Food Service Equipment carefully to avoid damage to components, enclosures, and finish. Do not install damaged Food Service Equipment. Replace and return damaged components to the Manufacturer.
- D. Owner Furnished Equipment: The FSEC will receive, accept and store the Owner Furnished Equipment until installation. The FSEC shall assume responsibility for the equipment and its condition upon receipt of the equipment by him or his representative.

1.04 PROJECT CONDITIONS

- A. Field Measurements: Take field measurements before ordering and fabrication, to assure accurate fit of fabricated equipment.
- B. Available Services: Verify electrical service characteristics and water, steam, and gas service pressures. Provide pressure-regulating valves where required for proper operation of equipment.

1.05 WARRANTIES

- A. Special Project Warranty: The FSEC shall ensure that the Manufacturer of Refrigeration Compressors shall provide a written warranty, signed by the Manufacturer, agreeing to replace or repair, within a five-year warranty period, Refrigeration Compressors with inadequate and/or defective materials and/or workmanship, including leakage, breakage, improper assembly, or failure to perform as required, provided Manufacturer's instructions for handling, installing, protecting, and maintaining units have been adhered to during warranty period. Two-year Labor warranty shall also be provided.

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- B. All Other Warranties: The warranty period for all items furnished (other than the aforementioned) shall be guaranteed against defects in workmanship and material for a minimum period of two (2) years, as specified in Section 01 78 30 – Warranties, Guarantees, and Bonds. This warranty shall include both Parts and Labor.
- C. The FSEC shall be responsible for returning all warranty cards to the Manufacturers as required. Should he fail to return the warranty cards, the FSEC shall be responsible for providing the same warranty to the Owner as required by the Manufacturer.
- D. Refer to Division 1 Section - Warranty for warranty format.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Stock Manufactured Items: Refer to PART 4 - FOOD SERVICE EQUIPMENT, herein.
- B. Stainless Steel: Provide AISI Type 304 non-magnetic sheets, free of buckles, waves, and surface imperfections.
 - 1. Finish for exposed surfaces to be No. 4 polished, unless specified otherwise.
 - 2. Protective covering shall be provided on all polished surfaces of stainless steel sheet work, and retained and maintained until time of final testing, cleaning, start-up, and Substantial Completion.
- C. Galvanized Sheet Steel: Use only if specified; comply with ASTM specifications for 'zinc-coated' (galvanized) iron or steel sheets, coils and cut lengths; it shall be mild, low carbon steel, zinc coated; ASTM A653, except for extensive forming; ASTM A924, G90 zinc coating, chemical treatment. A-98 coating shall be 1.25 oz per square foot coating class, also known as 'commercial'.
- D. Sheet Steel: Provide ASTM A1011 hot-rolled carbon steel.
- E. Stainless Steel Tube: Provide ASTM A554, Type 304 with No. 4 polished finish. All tubing shall be round unless specified otherwise.
- F. Aluminum: Provide ASTM B209 sheet and plate, ASTM B221 extrusions, 0.40-mil clear anodized finish where exposed, unless specified otherwise.
- G. White Metal: Provide corrosion-resistant metal containing not less than 21 percent nickel. Make castings free from pit marks, runs, checks, burrs, and other imperfections; rough grind, polish, and buff to bright luster.

In lieu of white metal castings, Type 302 18-8 stainless steel diecast or stamped may be used.
- H. Plastic Materials and Components: Except for Plastic Laminate, provide plastic materials and components that comply with NSF 51.
- I. Hardwood Work Surfaces: Provide laminated edge-grained hard maple (*Acer saccharum*), NHLA First Grade with knots, holes, and other blemishes culled out, kiln dried at 8 percent or less moisture, waterproof glued, machined, sanded, and finished with NSF-approved oil sealer. Provide minimum 2-1/4-inch thickness unless specified otherwise.

- J. Sound Deadening: Provide coating of sound deadening material at underside of all stainless-steel tops, drainboards, dishtables, and sinks. Sound deadening material to consist of NSF component smooth flowing Latex Sound Deadener, which is non-aging, does not become brittle and may be painted when dry.
- K. Sealants: Provide ASTM C920, Type S, Grade NS, Class 25, Use NT. When fully cured and washed, sealant shall meet the requirements of the Food and Drug Administration Regulation Title 21 CFR 177.2600 for use in areas where sealant comes in contact with food.
 - 1. The Owner's Representative shall select the color from the manufacturer's standard colors.
 - 2. Backer Rod shall be closed-cell polyethylene rod stock, larger than joint width.
- L. Gaskets: Provide solid or hollow (not cellular) neoprene or PVC light gray gaskets, minimum 40 Shore A hardness, self-adhesive or prepared for either adhesive application or mechanical anchorage.

2.02 WELDING

- A. All welding shall utilize the heliarc method with welding rod of the same composition as the sheets or parts to be joined.
- B. Welds shall be complete, strong and ductile with all excess metal ground and joints finished smooth to match adjoining surfaces.
- C. Welds shall be free of mechanical imperfections such as gas holes, pits, cracks, etc., and shall be continuously welded so that the fixtures shall appear as one-piece construction.
- D. Butt welds made by spot solder and finished by grinding shall not be acceptable.
- E. Spot welds shall have a maximum space of at least 1/4-inch length of the welding material at a maximum space of 4-inches from center to center. Weld spacing at the ends of the channel battens shall not exceed 2-inch centers.
- F. In no case shall soldering be considered as a replacement for welding, nor shall any soldering operation be done where dependence is placed on stability and strength of the joint.
- G. Welds made of spot-welding straps under seams and filling in with solder will not be acceptable.
- H. Fixtures shall be shop fabricated of one piece and shipped to the job completely assembled whenever possible. Equipment too large to transport or enter the building as one piece shall be constructed so that the field joints can be welded at the job site.
- I. All body joints made in the field shall be closely butted together, pulled together in the field and tightly belted on the inside or a concealed location.
- J. All exposed joints shall be ground flush with adjoining material and finished to harmonize therewith.
- K. Whenever material has been sunk or depressed by welding operation, such depression shall be suitably hammered and peened flush with the adjoining surface and, if

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necessary, again ground to eliminate low spots. In all cases, the grain of rough grinding shall be removed by successive fine polishing operations.

- L. All unexposed welded joints on undershelves of tables or counters in stainless steel construction shall be suitably coated at the factory with an approved metallic based paint.
- M. After galvanized steel members have been welded, all welds and areas where galvanizing has been damaged shall have a zinc dust coating applied in conformance with U.S. Government Military Specification Number MIL-P-26915.
- N. Butt joints and contact joints, wherever they occur, shall be close fitting and shall not require a filler. Wherever sheared edges occur, they shall be free of burrs, fins, and irregular projections, and shall be finished to obviate all danger of cutting or laceration when the hand is drawn over them. In no case shall overlapping materials be acceptable where miters or bull nosed corners occur.
- O. The grain of polishing shall run in the same direction on all horizontal and on all vertical surfaces of each item of fabricated equipment except in the case where the finish of the horizontal sections of each shall terminate in a mitered edge. Where sinks and adjacent drainboards are equipped with a splash, the grain of polishing shall be consistent in the direction throughout the length of the splash and sink compartment.
- P. Bolts, screws, nuts and washers shall be of steel, except where brass or stainless steel is fastened, in which case they shall be of brass or stainless steel, respectively. Screws shall be 2-inch long, pan head Philips No. 12. Where dissimilar metals are fastened, nuts, bolts, screws and washers shall be of similar grade metal. The spacing and extent of bolts and screws shall be such as to ensure suitable fastening and prevent buckling of the metals fastened.

2.03 ELECTRICAL

- A. Electrical Requirements: Confirm available Electrical Services, such as actual voltages available, number of phases, and number of wires, at the project site, before submitting product data and placing orders.
 - 1. Should requirements indicated on Drawings and in PART 4 - FOOD SERVICE EQUIPMENT, herein, be of larger sizes or higher standards than are required by manufacturer or by governing authorities having jurisdiction, requirements indicated on Drawings and in PART 4 - FOOD SERVICE EQUIPMENT, herein, shall govern.
 - 2. Should requirements indicated on Drawings and in PART 4 - FOOD SERVICE EQUIPMENT, herein, be of smaller sizes or lower standards than are required by manufacturer or by governing authorities having jurisdiction, requirements of manufacturer or of governing authorities having jurisdiction shall govern.
 - 3. All costs for compliance with requirements of manufacturer and of governing authorities having jurisdiction shall be included in the Contract Sum. Rulings and interpretations of code enforcing agencies shall be included in such requirements.
- B. Circuits and Rough-Ins:
 - 1. Permanent connections to the project site's Electrical Service shall be made in accordance with requirements as specified in DIVISION 26 - ELECTRICAL and shall comply with NFPA 70 - National Electrical Code (NEC).

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2. Make connections only at a junction box, by conductors in metallic conduit. Minimum size of junction boxes (unless specified otherwise) shall be 4-11/16-inches square and 1-1/2-inches deep, with 1/2-inch and 3/4-inch knockouts.
3. Utility chase areas accommodating junction and pull boxes shall be a minimum of 18-inches square.
4. Coordinate exact locations, types, and quantities of conductors and sealing of fittings with Electrical Drawings and with PART 4 - FOOD SERVICE EQUIPMENT, herein.
5. In cases where equipment is directly connected, provide a length of flexible steel, neoprene-jacketed, Seal-Tite conduit, Anaconda Type UA, or equal, complete with approved liquid-tight contactors on each end, designed to provide electrical grounding continuity; make input connection as short as possible, not to exceed 36-inches.
6. Provide proper and complete grounding of all metallic Food Service Equipment.

C. Wiring:

1. Exposed wet area applications shall be rigid galvanized steel conduit except for flexible connections. Thin wall conduit (EMT) shall not be used for wet area application. Exposed outlet boxes shall be cadmium-plated, cast steel with threaded hubs.
2. Exposed flexible connections shall be flexible steel, neoprene-jacketed, Seal-Tite conduit, Anaconda Type UA, or equal, complete with approved liquid-tight contactors on each end, designed to provide electrical grounding continuity.
3. Wiring for built-in strip heaters and immersion type elements shall have UL-listed insulation, not less than 300 volt rated, with listed nickel wire. Extend wiring in raceways or conduits to the junction or pull boxes with not less than 600-volt rated insulated wire.
4. Refrigerator and freezer cabinets: Provide conduit as necessary to connect internal components to the junction or pull boxes, and as follows.
 - a. Internal wiring shall be UL-listed, rubber-covered, 600-volt rated conductor, except for door heaters which shall be chrome wire with silicone braided jacket having resistance of 10.4 watts per lineal foot.
 - b. For freezer applications, provide wiring in rigid or flexible Seal-Tite Flex or equal (no known equal) EMT.
5. Outlets, including all convenience outlets, lighting receptacles (rubber or porcelain), and door switches shall be mounted within approved boxes. Convenience outlets for evaporators shall be twist-lock type. Solid connections for freezer evaporators shall be vapor tight.
6. Door switches for hinged doors shall be Arrow Hart No. 4039 or equal (no known equal); for sliding doors, provide UL-listed toggle switches.
7. Heating element controls for custom fabricated equipment, such as custom fabricated plate warmers shall be provided as follows.

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- a. Un-insulated cabinets with or without doors: provide 3-level switch.
 - b. Open front cabinets with or without insulation: provide variable controller.
 - c. Insulated cabinets with doors: provide thermostat.
- D. Starters, Switches and Controls: Provide starters, motor controls, switches, remote controls, and transformers as necessary.
1. All switches shall be located out of the heat zone. If ambient temperature will be above 100 degrees Fahrenheit, provide for adequate ventilation.
 2. Each motor driven appliance or electrical heating unit shall have a heavy-duty control switch, magnetic contactor or starter. Provide electrical controls, switches or other components being furnished loose by the manufacturer.
 3. Provide starters for across-the-line start, with thermal overload protection and manual overload reset. Push button stations shall be mounted in starter covers, except where necessary for starters to be mounted in a remote location.
- E. Convenience and Power Outlets: Provide all cut-outs, outlet boxes, cover plates, and all service fittings as necessary in Custom Fabricated Food Service Equipment as shown on document drawings and in PART 4 - FOOD SERVICE EQUIPMENT, herein; provide necessary conduits to extend to the junction box or pull box of the project site's Electrical System.
1. Outlets having a specific voltage for a single purpose application shall be of such design that plugs designed for other applications will not fit.
 2. Verify that outlets will match appliance plugs as indicated on Electrical Drawings and in PART 4 - FOOD SERVICE EQUIPMENT, herein. Replace cords and plugs if necessary.
 3. Electrical outlet devices shall be National Electrical Manufacturers Association (NEMA) Specification Grade and manufactured by Hubbell Inc., Square D by Schneider Electric, Bryant® by Hubbell Inc., General Electric®, Pass and Seymour by Legrand®, Arrow Hart by Cooper Industries or equal.
- F. Cords and Plugs: Provide UL-listed cords and plugs for stock manufactured and for custom fabricated equipment.
1. Cords are to be rubber-covered, three-wire cord of appropriate current capacity and appropriate length to suit use.
 2. Plugs are to be three-prong, ground type of appropriate NEMA configuration for electrical characteristics of equipment and serving outlet.
- G. Light Fixtures: Where light fixtures are specified as integral with Food Service Equipment, provide sockets, lamps and ballasts as appropriate. For fluorescent fixtures, provide DuLux Warm White lamps, unless specified otherwise.
- H. Internal Wiring of Custom Fabricated Fixtures or Equipment:
1. Obtain and pay for all Permits and Fees for inspection and approval of Electrical Work built into custom fabricated fixtures or equipment, for which a permit is required. Proof of inspection shall be attached to, and visible on, fixture.

2. All internal wiring built into, or forming an integral part of, a unit of custom fabricated fixtures or equipment shall be completely wired to a junction box built into the unit, ready for final connection to the project site's Electrical System as specified herein.
 3. Licensed Electricians shall perform all internal wiring of fixtures and equipment.
- I. The Electrical Contractor shall be responsible for all inter-connections between systems and the food service equipment. Refer to PART 3.01.H - FINAL CONNECTIONS, herein.

2.04 PLUMBING

- A. All dishwashers, hose reels, janitor sinks, garbage disposals, pre-rinse sprays and water supply units are to be fitted with mixing valve and pressure-reducing valve (per manufacturer requirements), to be supplied by the FSEC and installed by the Plumbing Contractor.
- B. All counter-top equipment requiring water connections must be provided with pressure-reducing valve per the Uniform Plumbing Code (UPC).
- C. Provide charcoal water filter for all ice and water stations, ice machines, tea and coffee machines.
- D. The Plumbing Contractor shall be responsible for all inter-connections between systems and the food service equipment. Refer to PART 3.01.H - FINAL CONNECTIONS, herein.
- E. The Plumbing Contractor shall install electrical shut-off gas valve(s), provided by the FSEC, in an accessible location above the ceiling.

2.05 HEATING EQUIPMENT

- A. Gas-Heated Appliances: All Gas-Operated and -Heated Equipment shall conform to applicable American Gas Association (AGA) standards and to all applicable Local and State Health Department regulations.
- B. Steam-Heated Appliances: All Steam-Heated Equipment shall be a self-contained assembly complete with control valves located in a readily accessible position.
- C. Heating Equipment Controls: Wherever Thermostatic Controls for Gas-, Electric-, or Steam-Heating Equipment are indicated or necessary, provide Controls complete and of materials, size, or rating as required.
- D. Cleaning Provisions: Heating Equipment shall be readily removable for cleaning.

2.06 REFRIGERATION EQUIPMENT

- A. Refrigeration Equipment, General: Provide refrigeration condensing units of size and capacities as indicated, consisting of compressors, condensers, receivers, motors, mounting bases, vibration isolators, refrigeration components, safety devices, electrical controls, refrigerant, and protective controls. Units are to be charged with refrigerant, all factory assembled and tested.
 1. Refrigerant: Utilize refrigerant with an ozone depleting potential of 0. The following refrigerants are listed as minimums:

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- a. R-404A Low to medium temperature
 - b. R-134a Medium temperature
 - c. R-22 High temperature
 - d. Glycol Food grade
2. Connections: Provide quick-connect-type piping connections to receive piping from evaporator coils.
 3. Outdoor Mounting: Provide weather-tight housing and low ambient controls for units mounted outdoors.
- B. Refrigerant Piping: Type ACR copper tubing, hard temper, with wrought fittings and silver solder joints. Insulate suction lines with 1/2-inch pre-molded foamed plastic insulation.
- C. Electrical Wiring: Provide required wiring between electrical rough-in and refrigeration units for proper operation.
- D. Plumbing Piping: Provide required water and drain piping between plumbing rough-in and refrigeration units for proper operation.
- E. Refrigeration Specialties: Provide as indicated refrigerant dryer, liquid line solenoid valve, suction line filter, expansion valve, and water regulating valve (for water-cooled condensers only).
1. Provide pump down control circuit consisting of thermostat and solenoid valve.
 2. Maintain box temperature from thermostat and liquid line solenoid valve; control compressor from suction pressure.

2.07 EXHAUST HOODS

- A. Fabricated Exhaust Hoods: Fabricate to specified UL-listed manufacturers specifications.
- B. Grease Removal: Provide removable grease baffles, with drip-channel gutters, drains, and collection basins unless specified otherwise.
- C. Light Fixtures: Provide fluorescent light fixtures, with vapor-tight sealed lens, and stainless-steel conduit where exposed for wiring.
- D. Exhaust Duct: Stainless steel with finish to match hood finish where exposed and galvanized steel where concealed.
- E. Stainless Steel Wall Flashing: Provide floor-to-ceiling, full width wall flashing under all exhaust hoods where a non-combustible wall surface is required.
1. Where walls enclose hoods, those walls shall be fully wrapped with stainless steel wall flashing.
 2. Wall flashing shall be a minimum Type 304, 18-gauge stainless steel.
 3. Sheets shall be set vertically with seams running perpendicular to the ceiling and floor.
 4. Joints shall be butt joints.

5. Seams and ends shall be capped with appropriate stainless-steel T-Molding or End Molding.
 6. Wall flashing shall extend a minimum of 3-inches above hood line and to below top of base molding.
 7. The FSEC shall provide appropriate holes (by hydraulic knockout) and utility cutouts no greater than 1/4-inch of stub-out size.
 8. Where electrical outlets require a square or rectangle cutout, the opening must be fully covered by the faceplate.
 9. Attach to walls with approved mastic.
- F. Trim: Provide and install stainless steel trim to ceiling and adjacent walls, fabricated of the same gauge and finish as the Exhaust Hood.
- G. The FSEC shall provide and install any additional support members to provide a complete installation of the exhaust hood. He shall also be responsible to weld collars to exhaust ducts.
- H. If make-up air duct is integral to exhaust hood, FSEC shall be responsible for final connection from ductwork to make-up air collar.

2.08 FIRE SUPPRESSION

- A. Provide a complete hood fire suppression system including manufacturer's data. Hood Fire Suppression System shall meet UL 300 requirements. The FSEC shall submit shop drawings to the local fire agency for approval, with a copy to the Food Service Design Consultant.
- B. All circuits must be shut down under the exhaust hood, either by shunt trip breaker or contactor (per local code), by the Plumbing Contractor who shall also install the manual reset provided by the FSEC.
- C. All gas supplies to kitchen cooking equipment shall shut off upon activation of the kitchen hood fire suppression system and activate the fire alarm.

2.09 MANUFACTURED PRODUCTS

- A. **Manufactured Products, General:** Provide Manufacturer's standard materials and equipment as specified, complete with all necessary and recommended fittings, fixtures, and accessories.

Manufactured items shall comply with applicable State Seismic requirements.

1. Manufactured items shall conform to applicable NSF standards and to all applicable Local and State Health Department regulations.
2. Comply with all applicable rules and regulations pertaining to adequate protection from and guarding of moving parts of otherwise hazardous equipment.
3. Electric-Operated and Electric-Heated Equipment shall conform to NEMA standards and be UL-listed and UL-labeled.

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4. Standard Steam-Heated Equipment shall be manufactured in accordance with ASME code requirements and bear the ASME label.
 5. Gas-Burning Equipment shall be manufactured in compliance with applicable AGA standards and bear the AGA label. Burners for gas-heated equipment shall be equipped with automatic lighters. Oven burners and other concealed burners shall have automatic safety pilots.
 6. Provide Pressure Regulators for all Gas-Operated and Gas-Heated Equipment as recommended by the manufacturer and to suit service pressures.
- B. Refrigerator Hardware: Heavy-duty die-cast zinc, chrome-plated and polished.
1. Hinges shall be edge mounted, self-closing type.
 2. Latches shall be edge mounted, arranged for locking devices.
- C. Handles and Pulls: Provide stainless steel Handles with No. 4 finish or die-cast zinc with polished chrome-plated finish. Provide die-stamped stainless-steel Pulls, recessed rectangular type, with beveled edge frame.
- D. Door Slides: Provide stainless steel Door Slides with minimum load capacity of 100 lbs. per pair, and with positive doorstop. Provide stainless steel ball-bearing rollers.
- E. Hinges: Provide stainless steel Hinges, continuous type or butt type as indicated.
- F. Sliding Door Hardware: Provide extruded aluminum Door Track. Provide galvanized steel Door Sheave with nylon surface and ball-bearing inner races. Provide stainless steel Bottom Guide Pins, spring loaded.
- G. Adjustable Shelf Supports: Provide stainless steel Shelf Supports, snap-in type, and stainless-steel Brackets with countersunk mounting holes.
- H. Catches: For hinged doors, provide permanent magnetic Catch of sufficient strength to hold door shut.
- I. Locks: Provide Manufacturer's standard brass 5-pin cabinet-type lock; provide two keys for each lock, keyed separately.
- J. Lever Drains: Provide 2-inch, heavy cast-bronze body, removable flat stainless-steel strainer, twist handle waste outlet with support bracket and one-piece connected chrome-plated brass overflow.
- K. Casters: Provide minimum 5-inch diameter wheel casters, with 1-1/8-inch tread width, complying with NSF standards. Provide sealed, self-lubricating bearings, cadmium-plated or bright zinc-plated steel disc wheels, and solid neoprene or polyurethane non-marking tires. Provide foot brakes on two (2) casters of four (4) required per unit unless specified otherwise.

2.10 CUSTOM FABRICATED EQUIPMENT AND FIXTURES

Custom fabricated items shall comply with applicable State Seismic requirements.

- A. General:

1. Fasteners: No exposed screw or bolt heads will be acceptable. Rivets, if specified, shall be countersunk and ground flush, and of the same material as the pieces joined together. Butt joints made by riveting straps under seams and then filling with solder will not be accepted.
 2. Rolled Edges: Rolled Edges shall be approximately 1-1/2-inch diameter, with corners bull nosed, ground and polished.
 3. Bends: All horizontal and vertical corners shall be covered with radius bends of 1/2-inches or larger.
 4. Corners: All corners shall be mitered and fully welded, ground, and polished. Butt joints at corners will not be accepted unless specified otherwise.
 5. Closures: Provide formed stainless steel to close and finish all fixtures, backsplashes, or shelves, or entire rear of unit, or the ends flush to walls or adjoining fixtures.
- B. Framing:
1. Mount tops on 1-1/2-inch by 1-1/2-inch by 1/8-inch galvanized angle iron, or 4-inch wide by 12-gauge galvanized channels.
 2. Mount dishtables and drainboards on 4-inch wide by 14-gauge stainless steel channels.
 3. Run framework around entire perimeter of unit, and cross brace on 30-inch centers.
 4. For dishtables and drainboards, run framing from front to back at each leg location, and run additional channel lengthwise, located at center of table width and welded to leg channels.
 5. Fasten framing to underside of top surfaces with 1/4-inch studs welded at approximately 12-inch centers.
 6. Provide each stud with suitable chrome-plated lock washers and cap nuts, and make stud lengths such that cap nuts can be made up tight bringing top down snugly to framing.
- C. Legs and Cross Rails:
1. Construct legs of 1-5/8-inch Outer Diameter, 16-gauge stainless steel tubing.
 2. Provide fully enclosed stainless-steel bullet shaped adjustable feet of Type 302 or Type 304 stainless steel exterior, not less than 1-1/2-inches in diameter, threaded for adjustment of 1-inch up or down without any threads showing.
 3. Fasten leg to 4-inch high stainless-steel enclosed gusset, with top completely sealed by means of stainless-steel plate.
 4. Fasten legs to sinks by means of stainless-steel enclosed gussets welded in place, sanitary type, stainless steel, reinforced with bushings and having set screws for securing legs.

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5. Fasten legs to metal tops and dishtables with stainless steel enclosed gussets, as above, welded to stainless steel channels 14-gauge or heavier.
 6. Fasten legs to wood top tables by means of welding to stainless steel channels anchored to top with screws.
 7. Weld gussets continuously to bottom of unit framing.
 8. All equipment longer than seven (7) feet shall be provided with a minimum of six (6) legs.
- D. Metal Tops:
1. Fabricate of 14-gauge stainless steel, one-piece welded construction, with exposed edges rolled and with corners bull nosed.
 2. Reinforce on underside with galvanized steel channels welded in place so tops can support heavy weights without deflection. Provide cross braces at not more than 30-inches on center.
 3. Where tops are adjacent to walls or adjoining equipment, provide integral splashes with all corners, both vertical and horizontal, coved a minimum of 1/2-inch radius.
 4. Splashes shall be a minimum of 6-inches high including a 1-inch horizontal return to wall and 1-inch vertical drop (for 'Z' clip installation) and enclosed ends.
 5. Field joints in tops are to be sanitary, tight and without open seams, by means of welding or by properly designed draw fastenings, trim strips, or commercial joint material to suit the purpose required.
 6. Provide knock out and grommet for countertop equipment.
- E. Cabinet Bodies:
1. Fabricate of 18-gauge stainless steel, with end panels formed with round corners for free-standing units, and square corners for fixtures that adjoin walls or other fixtures.
 2. Provide 90-degree retentions on end panels at front and rear, turned in toward body of cabinet and welded for reinforcement.
 3. For cabinets with open shelving, provide double-wall inner panels.
 4. Weld ends to horizontal angle or channel members to form integral cabinet base.
 5. Provide backs of same material as ends, with vertical edges turned in to match edges of ends.
 6. Weld, making flush joints.
 7. Provide all cabinets with full-height corner bumpers, wrapped around corner 2" each side, and crimped to cabinet face.
- F. Dishtables and Drainboards:

1. Fabricate of 14-gauge stainless steel, with exposed edges formed into 1-1/2-inch by 190-degree rolled rim approximately 3-inches high.
2. Provide built-in pitch to tubs of 1/2-inch minimum.
3. Provide minimum 10-inch high backsplashes including 2-inch return on 45-degree angle, 1-inch horizontal return to wall and 1-inch vertical drop with offset (for 'Z' clip installation) and enclosed ends, or 1-1/2-inch diameter rolled rim, as indicated.
4. Construct the front rim and backsplash of the drainboard on a continuous level plane with the sink it adjoins.
5. Support drainboards 36-inches and longer with legs.
6. Cove all corners, both vertical and horizontal, a minimum of 3/4-inch radius.

G. Sinks:

1. Fabricate from 16-gauge stainless steel, with interior corners rounded to a 1-inch radius, both horizontally and vertically, forming cove in bottom.
2. Construct sink with butt-edge joints welded, ground smooth and polished so joints are imperceptible.
3. Finish sinks to match stainless steel top. Where sink bowls are exposed below countertop, finish sink exterior to match top.
4. Divide multiple compartment sinks with double-wall, 16-gauge stainless steel partitions rounded to 1/2-inch radius on top and having corners rounded the same as other corners in sinks. Provide multiple compartment sinks with continuous face at exposed front.
5. Provide back, bottom, and front of one continuous piece with no overlapping joints or open spaces between compartments.
6. Pitch bottom of each compartment, and crease to die-stamped recess to receive lever-type drain, without use of solder, rivets, or welding.
7. Finish front and exposed ends of sink countertop with 1-1/2-inch, 190-degree rolled edge.
8. Finish back and ends adjacent to walls or other fixtures with backsplash.
9. Punch backsplash to receive wall-mounted faucets.
10. For sinks in worktops, construct as above but omit roll edges and backsplashes. Fabricate bowl to be flush with work surface.
11. Provide stainless steel wall flashing from finished floor to ceiling behind all sinks where FRP or ceramic tile is not indicated.

H. Drains, Wastes and Faucets:

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1. Provide 2-inch, heavy cast bronze body, with removable flat stainless-steel strainer, twist handle waste outlet with support bracket and one-piece connected chrome-plated brass overflow.
 2. Provide 3-1/2-inch crumb cup waste outlets in all die-drawn inset type sinks.
 3. Faucets: As specified.
 4. Dipperwells: As specified.
- I. Undershelves:
1. Construct of 16-gauge stainless steel.
 2. Open Base Shelving: Edges shall be rolled down on open sides, with a 2-inch turn-up on rear and ends where adjacent to walls and other equipment.
 - a. Neatly notch corners and weld to legs.
 - b. Reinforce shelving longitudinally with 14-gauge formed channel welded to underside.
 - c. In fixtures with open bases, provide shelves notched a full 90 degrees and welded tightly to legs, with tight joints at all intersections of shelf and leg.
 3. Bottom Shelves: Extend forward and turn down at front so as to be flush with front facing of cabinet.
 4. Fixed Intermediate Shelves: Weld to front stiles and to 16-gauge stainless steel brackets so that shelf is 1-inch away from back and ends of cabinet.
 5. Adjustable Shelves: Channel on all four (4) sides, weld corners, and mount on removable stainless-steel standards.
 6. Construct removable shelves as above, fit over cross rails and do not exceed shelving sections of 30-inches long; where one section abuts another, turn down edges 1-inch.
 7. Enclosed Base Shelving: Turn up at back and sides and feather slightly to insure a tight fit to enclosure panels.
- J. Overshelves:
1. Construct of 16-gauge stainless steel.
 2. Set shelves mounted over equipment not adjacent to walls on 1-inch by 16-gauge stainless steel tubular standards fitted with stainless steel base flanges.
 3. Completely weld top of tubular standards to 16-gauge stainless support channels; run channels full width of overshef.
 4. Where overshelves are mounted above tables, run 1/2-inch steel tension rods through counter-tops, stanchions, and reinforcing angle framing, and secure with nuts and lock washers to assure stable sway-free structure.

5. Where shelves are mounted over drainboards or dishtables, mount on upturned rolled edges omitting flanges, and scribe lower end of tube to match contour of roll. Secure as in table-mounted method.

K. Cabinet Doors:

1. **General:**

- a. Fabricate with double-pan construction of stainless steel with edges formed into a channel extending around all sides, forming doors 3/4-inch thick.
- b. Fabricate outer pans of 18-gauge stainless steel with corners welded, ground smooth, and polished.
- c. Include wood fibers sound deadening material within door assembly.
- d. Fabricate inner pans of minimum 20-gauge stainless steel, fitted tightly into outer 18-gauge pan.
- e. Fully weld pans together.
- f. Where single pan-type doors are indicated, fabricate of 16-gauge stainless steel, reinforced and stiffened with closed hat sections to prevent flexing.

2. **Sliding Doors:**

- a. Mount doors on large ball bearing, quiet rollers in 14-gauge stainless overhead tracks. Provide resilient stops.
- b. Construct sliding doors to be removable without use of tools, for cleaning purposes.
- c. Provide U-shaped or Loop stainless steel handle on each door.
- d. Where specified, provide doors with locks.

3. **Hinged Doors:**

- a. Mount hinged doors on stainless steel, continuous-type hinges.
- b. Construct hinged doors so that face is flush with cabinet body.
- c. Provide each door with U-shaped or Loop stainless steel surface door pull and magnetic catches.
- d. Where indicated, provide doors with locks.
- e. Provide permanent magnetic catch of sufficient strength to hold door shut.

L. Drawers:

1. Construct front of double-pan stainless steel, 16-gauge exterior and minimum 20-gauge interior.

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2. Size: Minimum 5-inches deep, 1-inch thick, with other dimensions as specified and to suit installation.
3. Provide cylinder lock for drawers, unless specified otherwise.
4. Fasten drawer suspension guides to 18-gauge stainless steel housing suspended from angle framing under fixed top.
5. Mount drawers on fabricated 16-gauge stainless steel interlocking channel supports with large size, quiet ball-bearing wheel suspension and stops to prevent drawers from being pulled out of fixture.
6. Construct support slides so that drawers may be pulled out minimum of two-thirds of drawer length and support heavy loads without deflection. Drawers shall be easily removable without the use of tools.
7. Provide U-shaped or Loop stainless steel handle for each drawer.
8. For removable pan-type drawers, fabricate as a rigid self-supporting unit. Drawer body shall have flanged top for support in drawer frame and shall be as specified above. Provide replaceable, full neoprene bumpers.
9. For drawers in refrigerated sections, provide removable-type, perforated body, mounted on large ball-bearing wheels in flat tracks. Wheels shall be similar to heavy-duty urethane roller skate wheels. Wheels and bearings shall be corrosion-resistant, longwearing material, grease packed before assembly. For drawers in refrigerated sections, provide full-perimeter, soft gaskets.
10. Liner to be lift-out type, one-piece construction, and die stamped of 20-gauge stainless steel, with inside radiused corners.
11. Drawer pans shall be removable without removing frame from fixture.

M. Wall Shelves:

1. Construct of 16-gauge stainless steel with 1-1/2-inch roll on front and exposed ends, and with 2-inch turn-up on back and ends where adjacent to walls or other fixtures.
2. Miter and weld all corners.
3. Construct wall brackets of 14-gauge stainless steel with 1-1/2-inch flange at wall and completely welded to underside of shelf.
4. Fasten each bracket to wall with minimum of two stainless steel pan head screws, Philips No. 12, 2-inch long.
5. Install so that shelf sets 1-inch away from wall.
6. Adjustable shelf supports shall be snap-in type with stainless steel brackets with countersunk mounting holes.
7. Wall backing is required.

- N. Wall Backing: Where indicated on Food Service Consultant's drawings, provide wall backing to run six inches beyond full length of equipment item at each side.
1. For Wood Frame Construction: The General Contractor shall provide and install wood blocking. Secure wall blocking in between studs.
 2. For Metal Frame Construction: The FSEC shall provide and the General Contractor shall install metal backing. Metal backing shall be at least 14-ga galvanized steel. Secure wall backing to studs.
- O. Cold Pans:
1. Fabricate from 16-gauge stainless steel lining and 20-gauge stainless steel casing.
 2. Cove interior vertical and horizontal corners.
 3. Insulate sides, ends, and bottom with material thermally equal to 2-inch thickness of fiberglass.
 4. Sweat 1/2-inch-diameter copper cooling coils to underside cold pan, and seal in thermomastic material.
 5. Turn down countertop (and/or flange) 1-inch into pan; install completely concealed 1-inch-wide plastic breaker strip; install 1-inch chrome-plated drain with plug.
 6. Provide 1/2-inch high false bottom of 16-gauge perforated stainless steel in removable sections.
 7. All cold pans, ice pans, refrigerated pans and cabinets shall be provided with breaker strips where adjoining top of cabinet face materials to prevent transfer of cold.
 8. Where cold pans and other inserts are to be installed in cabinet bases, provide apron the full depth of insert and of same material as cabinet body with reinforced openings as required; form in openings on all sides.
- P. Casters:
1. Heavy-duty, NSF-approved, sealed wheel and swivel ball bearings, solid or disc wheel, with greaseproof neoprene or polyurethane tire, and bright chrome plated finish on steel.
 2. Wheel diameter: 5-inch, minimum.
 3. Tread width: 1-3/16 inch, minimum.
 4. Capacity per caster: 250 pounds, minimum.
 5. Include stainless steel rotating wheel guard.
 6. A minimum of two (2) casters shall have brakes.

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- Q. Corner Guards: All exposed corners shall be provided with 14-gauge S/S corner guard, full height to ceiling. Guards to be full height corner bumpers, wrapped around corner 2 inches each side, and crimped to the face of the wall or fixture.
- R. Curbs: Construct of 16-gauge galvanized steel, fully welded and reinforced where necessary.
- S. Sneeze Guards:
 - 1. Frame to be constructed of 1-1/2" Outer Diameter, stainless steel tubing; stainless steel fittings to be welded, ground smooth and polished; no exposed screw heads, bolt heads, or solder joints permitted.
 - 2. Front and end panels to consist of 1/4" tempered glass trimmed by glazing into a 3/8" by 3/8" U-shaped stainless-steel channel; panels to be removable from frame without tools.
 - 3. Shelves to consist of 3/8" tempered glass trimmed by a snug-fitting gasket seated firmly against round tubing frame.
- T. Wall Flashings: Provide wall flashings where indicated on Food Service Consultant's drawings.
 - 1. Wall flashing shall be a minimum Type 304, 18-gauge stainless steel.
 - 2. Sheets shall be set vertically with seams running perpendicular to the ceiling and floor.
 - 3. Joints shall be butt joints.
 - 4. Seams and ends shall be capped with appropriate stainless steel T-Molding or End Molding.
 - 5. Wall flashing shall extend a minimum of 12-inches below splash.
 - 6. The FSEC shall provide appropriate holes (by hydraulic knockout) and utility cutouts no greater than 1/4-inch of stub-out size.
 - 7. Where electrical outlets require a square or rectangle cutout, the opening must be fully covered by the faceplate.
 - 8. Attach to walls with approved mastic.
 - 9. Provide and install stainless steel trim to ceiling and adjacent walls, fabricated of the same gauge and finish.

2.11 WALK-IN COOLERS

- A. Panel Construction:
 - 1. Panels shall be pre-fabricated, sectional constructed (4-inches thick for Coolers, 5-inches for Freezers, 5-inches for Ceiling), of tongue and groove design on the male side of all interior and exterior panels. All gaskets are factory installed, adhesive backed with supplemental mechanical fasteners and require no additional handling.

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2. Gaskets shall be resistant to chemical corrosion and ultraviolet radiation. Gasket operating temperature shall be -30 degrees F to +160 degrees F (-34 degrees C to +71 degrees C).
 3. All corner and tee panels shall be manufactured with radius corners in accordance with NSF approved construction.
 4. Panels shall be completely filled with rigid 100% foamed-in-place R141b blown, non-CFC urethane between interior and exterior metal 'skins' which have been die-formed and gauged for uniformity in size. Slab urethane or wood shall not be acceptable in any panel including doors, walls, floor, and ceiling.
 5. Insulation shall have a 95% closed cell structure with an average in-place density of 2.2 lbs per cubic foot, and compression strength at yield point of 19 lbs per square inch. Each panel shall have a thermal conductivity (K factor) of .14 BTU/hr/sq ft per degrees Fahrenheit per inch (R28 for Coolers, R36 for Freezers); and an overall coefficient of heat transfer (U factor) of not more than .035.
 6. Floor panels: Floor panels shall be die stamped with 3/8-inch radiused NSF coved corners. All plane intersections shall be drawn, not cut and welded. Panels shall be fabricated similar to other panels and designed to readily withstand uniformly distributed loads of 700 lbs. per square foot.
- B. Door Construction: Doors shall be flush (in-fitting) type, self-closing, 36-inches by 80-inches high.
1. Doors shall be mounted with three cam-lift hinges and posi-seal (hydraulic, not spring) adjustable door closers. Door hardware shall be chrome plated. Mounting height of latching hardware shall be 30 to 40 inches above finish floor. All hardware shall meet the requirements of the State's Building Code and the American Disabilities Act.
 2. Door latches shall lock and have a safety release to prevent entrapment (one quarter turn of the release handle unlocks the door from the inside).
 3. The freezer door will be provided with a low wattage (5 watts/foot) heater strip and a heated pressure relief port.
 4. Provide a solid-state electronic thermometer, pre-wired vapor proof light fixtures and pilot lights switch on each door section.
 5. The doorjamb, frames, and thresholds shall be made of durable Fiberglass Reinforced Plastic (FRP).
- C. Assembly: Panels shall be assembled by Posi-Lock or equal (no known equal), which shall be foamed-in-place and activated by a hex wrench. Floor panels shall utilize post tension construction within the floor panels. Access ports to locking devices shall be covered by snap caps and shall be located in interior of walk-in.
- D. Finishes: Refer to the Finish Schedule shown on the Foodservice Floorplan
1. Exposed interior and exterior surfaces (walls, ceiling and closure panels)
 - a. 20-gauge Type 304 stainless steel, #3 finish

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- b. 0.040 Stucco embossed aluminum
- 2. Exposed exterior shall have .080-inch thick diamond tread +42-inch high kickplate
- 3. Unexposed surfaces to be 26-gauge embossed galvanized steel
- 4. Inside Floor
 - a. Smooth aluminum or stainless steel, reinforced with non-skid floor strips
 - b. Quarry Tile with 6-inch high coved base
 - c. Epoxy with 6-inch high 16-gauge stainless steel coved base
 - d. Sealed concrete with 6-inch high 16-gauge stainless steel coved base
- E. Accessories:
 - 1. Provide and install .10-inch corrosion-resistant T-31 aluminum alloy diamond tread kickplates to 42-inches high on interior and exterior doors and door panels.
 - 2. Provide closure panels to interior ceiling and all adjacent walls, finished with 90-degree angles at the box and the ceiling/wall; no raw edges will be accepted.
 - 3. Provide vinyl strip curtains.
 - 4. Provide externally mounted digital thermometer.
 - 5. Per document drawings, provide 14-inches by 24-inches view port - unheated for cooler door, heated for freezer door.
- F. Insulated Floor Depressions: The FSEC shall provide styrofoam insulation for cooler and freezer floors. Insulation shall be 60 high load extruded polystyrene, 2-inch thick, with R-value, 75°F mean temperature, min 5.0/inch°F ft square h/BTU; Compressive Strength: vertical, 60.0 lb/inch square; Water Absorption maximum 0.1% by volume.
- G. Approvals: Fire hazard classification according to ASTM E84 (UL 723) shall be a flame spread rating of 25 or less with a certifying UL label attached to every panel showing the meeting of the fire code. Smoke development rating to be 450 or less; Factory Mutual approved; NSF-listed with an approved toxicity rating.
- H. Walk-in coolers and freezers shall have level maneuvering clearances at the exterior side and accessible entry and exit door hardware.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Installation, General: Set each item of non-mobile and non-portable equipment securely in place, level, and adjust to correct height.

All items shall comply with applicable State Seismic requirements.

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1. Anchor products to supporting substrate where indicated and where required for sustained operation and use without shifting or dislocation.
 2. Conceal anchorages where possible.
 3. Adjust countertops and other work surfaces to level tolerance of 1/16-inch maximum offset, and maximum variation from level or indicated slope of 1/16-inch per ft.
 4. Where indicated or required for safety of equipment operator, anchor equipment to floor or wall. Provide legs with adjustable flanged foot where equipment is indicated to be anchored to floor. Install two (2) anchors on each foot.
- B. Field Joints: Complete field-assembly joints (joints that cannot be completed in shop) by welding, bolting-and-gasketing, or similar methods as indicated.
1. Grind welds smooth and restore finish.
 2. Set or trim gaskets flush, except for T-gaskets as indicated.
- C. Enclosed Spaces: Treat spaces that are inaccessible after equipment installation by covering horizontal surfaces with powdered borax at rate of four (4) ounces per square foot.
- D. Closure Plates and Strips: Install where required, with joints coordinated with units of equipment.
- E. Cutouts: Provide cutouts in Food Service Equipment where required to run plumbing, electric, gas, or steam lines through equipment items for final connections.
- F. Sealants and Gaskets: Install completely around each unit to make joints airtight, watertight, vermin-proof, and sanitary for cleaning purposes.
1. In general, make sealed joints not more than 1/8-inch wide, and stuff backer rod to shape sealant bead properly, at 1/4-inch depth.
 2. Shape exposed surfaces of sealant slightly concave, with edges flush with faces of materials at joint.
 3. At internal-corner joints, apply sealant or gaskets to form a sanitary cove, of not less than 3/8-inch radius.
 4. Provide sealant-filled or sealant-gasketed joints up to 1/2-inch joint width and metal closure strips for wider joints with sealant application each side of strip.
 5. Anchor gaskets mechanically or with adhesives to prevent displacement.
 6. All fixtures adjacent to wall shall be sealed to wall as specified.
- G. Owner Furnished/Contractor Installed Equipment:
1. Existing Equipment: The Contractor is responsible for removing, cleaning, repairing (if required) and re-installing equipment designated as Existing Equipment, coordinating removal of Existing Equipment with the Owner Representative. The Contractor will be responsible for all connectors, valves, regulators, and hard and flexible connections to make the Existing Equipment operational per manufacturer's standards. The Contractor will coordinate Existing

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Equipment requiring remote refrigeration with all refrigeration systems, ensuring that such Equipment is operational per manufacturer's standards.

2. New Equipment: The FSEC will receive, accept, and store Owner Furnished Equipment at approved, designated area on site. All freight damage will be noted and a claim for the damage will be filed by the FSEC on behalf of the Owner. The FSEC shall provide a storage trailer to store Owner Furnished Equipment if necessary.
 3. Final installation of the Owner Furnished Equipment is the responsibility of the FSEC, who will be responsible for all connections, valves, regulators, and hard and flexible connections to make the Owner Furnished Equipment an operating system per manufacturer's standards. The FSEC will coordinate Owner Furnished Equipment requiring remote refrigeration with all refrigeration systems, ensuring that such equipment is operational per manufacturer's standards.
 4. The Owner shall supply to the FSEC current specification sheets, lists of provided equipment and scheduled shipment and arrival dates. The FSEC will coordinate all required cutouts and electrical, plumbing, and mechanical coordination with the trades to allow for proper installation.
 5. The FSEC shall provide three (3) bound sets of all Operation and Maintenance Manuals to the Owner's Representative.
- H. Final Connections:
1. Final hook-ups are not part of the scope of work of the FSEC. All final hook-ups (plumbing, mechanical and electrical) shall be part of the General Contractor's area of responsibility. The General Contractor shall make allowances for elbows, traps, etc., as well as make final connections on the job, supply all necessary valves, traps, steam traps, faucets, starting switches for motors, etc., except where specifically noted otherwise in the written specifications.
 2. The Contractor shall be responsible for all inter-connections between systems and the food service equipment.
- I. Installers shall be responsible for verifying dimensions.

3.02 FIELD QUALITY CONTROL

Testing: Coordinate start-up of Food Service Equipment when service lines have been tested, balanced, and adjusted for pressure, voltage, and similar considerations. Do not operate steam lines until they have been cleaned and treated for sanitation. Before testing, lubricate each equipment item in accordance with manufacturer's recommendations.

- A. Included in the testing is all Owner Furnished Equipment and Existing Equipment.
- B. Test each item of operational equipment to demonstrate that it is operating properly and that controls and safety devices are functioning.
- C. Repair or replace equipment found to be defective in its operation, including units that are below capacity or operating with excessive noise or vibration.
- D. Testing is to include any service charges due to improper installation, lack of proper connectors, or missing equipment.

3.03 CLEANING

- A. After completion of installation and other major work in Food Service areas, remove protective coverings, if any, and clean Food Service Equipment, internally and externally.
 - 1. Restore exposed and semi-exposed finishes to remove abrasions and other damages; polish and buff exposed-metal surfaces and touch-up painted surfaces.
 - 2. Replace work that cannot be successfully restored.
- B. Final Cleaning: After testing and start-up, and before time of Substantial Completion, clean Food Service Equipment, and leave in condition ready for use in Food Service.

3.04 ADJUSTMENT OF EQUIPMENT AND DEMONSTRATION

- A. Turn on all mechanical equipment, test for leaks, poor connections, inadequate or faulty performance and correct if necessary; adjust for proper operation.
 - 1. All thermostatically controlled equipment and equipment with automatic features shall be operated for a sufficient length of time to prove controls are functioning as intended.
- B. At a time and date selected by the School District Representative, the FSEC shall arrange for a demonstration of all mechanical equipment for the School District and his appointed representatives. These demonstrations are to be conducted by factory-trained engineers of the various equipment manufacturers and shall be done in two stages: one for the operations people and the second for maintenance personnel. A representative of the FSEC must be in attendance at all demonstrations.
- C. The FSEC shall provide the School District with one copy of a video film in VHS format depicting the operations and maintenance on each piece of equipment.
- D. The FSEC shall provide all necessary instructional training for all emergency equipment, gas turn-offs, fire extinguishers, fire suppression systems, high-temperature alarm system, etc., including, if any, emergency generating equipment.
- E. The FSEC shall provide all necessary instructional training for all safety equipment.

3.05 CLOSEOUT PROCEDURES

- A. Start-up of Food Service Equipment
 - 1. Utilities (lighting of pilot lights, etc.) by General Contractor
 - 2. FSEC to provide for Manufacturer's Service Agent to ensure systems are properly connected and are operational per manufacturer's required specification.
 - 3. FSEC to provide for Manufacturer's Representative to demonstrate how to properly operate all food service equipment.
 - 4. FSEC to provide manufacturer inspection certification for all items for School District Representative's acceptance, otherwise will consider not meeting the project specifications.

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- B. Provide services of the Contractor's technical representative and the Manufacturer's technical representative (where required) to instruct School District personnel in the operation and maintenance of Food Service Equipment
 - 1. Schedule training with the School District Representative.
 - 2. Provide at least 7-day notice of training date to the School District Representative.
- C. O&M Manuals: Provide three (3) bound sets of all Operation and Maintenance Manuals.
- D. The Contractor to provide a walk-through with the School District Representative prior to turning the project over to the School District for operation

END OF SECTION

SECTION 11 52 13

PROJECTION SCREENS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Manually operated projection screens.
 - 2. Electrically operated projection screens and controls.
- B. Related Sections:
 - 1. Section 05 50 00 – Metal Fabrications: for metal support framing for projection screens.
 - 2. Division 26 Sections for electrical service and connections including device boxes for switches and conduit, where required, for low-voltage control wiring.

1.03 DEFINITIONS

- A. Gain of Front-Projection Screens: Ratio of light reflected from screen material to that reflected perpendicularly from a magnesium carbonate surface as determined per SMPTE RP 94.
- B. Half-Gain Angle: The angle, measured from the axis of the screen surface to the most central position on a perpendicular plane through the horizontal centerline of the screen where the gain is half of the peak gain.

1.04 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For projection screens. Show layouts and types of projection screens. Include the following:
 - 1. For manually operated projection screens:
 - a. Drop lengths.
 - b. Anchorage details.
 - c. Accessories.
 - 2. For electrically operated projection screens and controls:
 - a. Location of screen centerline relative to ends of screen case.
 - b. Location of wiring connections for electrically operated units.

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- c. Location of seams in viewing surfaces.
 - d. Drop lengths.
 - e. Anchorage details, including connection to supporting structure for suspended units.
 - f. Details of juncture of exposed surfaces with adjacent finishes.
 - g. Accessories.
 - h. Wiring diagrams.
3. Maintenance Data: For projection screens to include in maintenance manuals.

1.05 QUALITY ASSURANCE

- A. Source Limitations for Projection Screens: Obtain projection screens from single manufacturer. Obtain accessories, including necessary mounting hardware, from screen manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Environmental Limitations: Do not deliver or install projection screens until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.07 COORDINATION

- A. Coordinate layout and installation of projection screens with adjacent construction, including ceiling suspension systems, light fixtures, HVAC equipment, fire-suppression system, and partitions.

1.08 WARRANTY

- A. Provide Owner with a written warranty as a condition of work acceptance, signed by contractor and installer agreeing to maintain, repair and/or replace products and materials for one year following Notice of Completion, and without additional cost to Owner, as specified in Section 01 78 30 – Warranties, Guarantees, and Bonds.

PART 2 - PRODUCTS

2.01 MANUALLY OPERATED PROJECTION SCREENS, CEILING MOUNTED

- A. General: Manufacturer's standard spring-roller-operated units, consisting of case, screen, mounting accessories, and other components necessary for a complete installation.
 - 1. Screen Mounting: Top edge securely anchored to a 3-inch diameter, rigid steel roller; bottom edge formed into a pocket holding a tubular metal slat, with ends of slat protected by plastic caps, and with a saddle and pull attached to slat by screws.

- B. Recessed, Ceiling-Suspended, Metal-Encased, Manually Operated Screens: Units designed and fabricated for suspending from wall brackets or ceiling, fabricated from formed-steel sheet not less than 0.027-inch-thick or from aluminum extrusions; with vinyl covering or baked-enamel finish and matching end caps. Provide mounting brackets unless otherwise indicated.
 - 1. Products: Subject to compliance with requirements, provide the following product or comparable, or equal product:
 - a. Draper, Inc.; Silhouette Series M 16:9 (Basis of Design)

2.02 ELECTRICALLY OPERATED PROJECTION SCREENS

- A. General: Manufacturer's standard units consisting of case, screen, motor, controls, mounting accessories, and other components necessary for a complete installation. Provide units that are listed and labeled as an assembly by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Controls: key-operated, three-position control switch installed in recessed device box with flush cover plate [matching other electrical device cover plates in room where switch is installed].
 - a. Provide one control switches for each screen.
 - b. Provide power supply for low-voltage systems if required.
 - b. Provide locking cover plates for switches.
 - c. Provide key-operated, power-supply switch.
 - d. Provide video interface control for connecting to projector. Projector provides signal to raise or lower screen.
 - 2. Motor in Roller: Instant-reversing motor of size and capacity recommended by screen manufacturer; with permanently lubricated ball bearings, automatic thermal-overload protection, preset limit switches to automatically stop screen in up and down positions, and positive-stop action to prevent coasting. Mount motor inside roller with vibration isolators to reduce noise transmission.
 - 3. Screen Mounting: Top edge securely anchored to rigid metal roller and bottom edge formed into a pocket holding a 3/8-inch- diameter metal rod with ends of rod protected by plastic caps.
 - a. Roller for motor in roller supported by vibration- and noise-absorbing supports.
- B. Suspended, Electrically Operated Screens without Ceiling Closure: Motor-in-roller units designed and fabricated for suspended mounting, with bottom of case entirely or partially open under screen compartment.
 - 1. Products: Subject to compliance with requirements, provide the following or comparable, or equal product:
 - a. Motor in Roller:

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- 1) Draper, Inc.; Paragon. (Basis of Design)
2. Provide metal or metal-lined wiring compartment on units with motor in roller.
3. Screen Case: Made from metal.
4. Provide screen case with trim flange to receive ceiling finish.
5. Finish on Exposed Surfaces: Vinyl covering or baked enamel.

2.03 FRONT-PROJECTION SCREEN MATERIAL

- A. High Contrast Grey Viewing Surface: Peak gain not less than 0.9, and gain not less than 0.8 at an angle of 50 degrees from the axis of the screen surface.
 1. Products: Subject to compliance with requirements, provide the following or equal:
 - a. Draper, Inc.; Silhouette, Series M with Contrast Grey.
- B. Material: Vinyl-coated, glass-fiber fabric.
- C. Mildew-Resistance Rating: 0 or 1 when tested according to ASTM G21.
- D. Flame Resistance: Passes NFPA 701.
- E. Flame-Spread Index: Not greater than 75 when tested according to ASTM E 84.
- F. Seamless Construction: Provide screens, in sizes indicated, without seams.
- G. Edge Treatment: Black masking borders.
- H. Size of Viewing Surface: 16:9 with 60-inches height, Wide Format: 106.6 inches.
- I. Provide extra drop length of dimensions and at locations indicated.
 1. Color: Black.
- J. Options:
 1. Provide Auto-Return spring roller with built-in inertia reduction mechanism.

PART 3 - EXECUTION

3.01 FRONT-PROJECTION SCREEN INSTALLATION

- A. Install front-projection screens at locations indicated to comply with screen manufacturer's written instructions.
- B. Install front-projection screens with screen cases in position and in relation to adjoining construction indicated. Securely anchor to supporting substrate in a manner that produces a smoothly operating screen with vertical edges plumb and viewing surface flat when screen is lowered.
 1. Install low-voltage controls according to NFPA 70 and complying with manufacturer's written instructions.

- a. Wiring Method: Install wiring in raceway except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Use UL-listed plenum cable in environmental air spaces, including plenum ceilings. Conceal raceway and cables except in unfinished spaces.
2. Test electrically operated units to verify that screen controls, limit switches, closures, and other operating components are in optimum functioning condition.
3. Test manually operated units to verify that screen-operating components are in optimum functioning condition.

3.02 PROTECTING AND CLEANING – PROJECTION SCREENS

- A. Provide temporary covering of projection screens until time of Substantial Completion. Use type of covering approved by screen manufacturer that will effectively protect screen from abrasion, breakage, or other damage.
- B. Clean projection screens on both faces immediately before date scheduled for inspection intended to establish date of Substantial Completion. Use methods and cleaning materials recommended by screen manufacturer, taking care not to scratch or damage optical coatings or screen substrates.

3.03 PROJECTION SCREEN SCHEDULE

- A. Manually Operated, Front-Projection Screen Type:
 1. Screen Surface: contrast gray.
 2. Viewing Surface Size: 16:9 with 60-inches height, Wide Format: 106.6 inches.
 3. Extra Drop Length: As needed at top of screen for bottom of screen to be 48 inches (no less than 3'-6") above finish floor.
- B. Electrically Operated, Front-Projection Screen Type: Suspended, with automatic ceiling closure.
 1. Motor Configuration: Motor in roller.
 2. Screen Surface: contrast gray.
 3. Viewing Surface Size: 96 by 170.6 inches, Wide Format.
 4. Extra Drop Length: As needed at top of screen for bottom of screen to be 48 inches (no less than 3'-6") above finish floor.

END OF SECTION

SECTION 11 61 43

STAGE CURTAINS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Scope: The extent and type of all stage rigging and stage draperies and related tracks, etc., are shown and scheduled on the drawings. Provide and install each type of rigging, drapery, and track, as a complete unit produced by a single manufacturer, including necessary mounting hardware, accessories, fittings, and fastenings. Provide all necessary labor, materials, equipment, transportation, and services required for the complete installation of the stage rigging and stage curtains.

1.02 RELATED WORK

- A. Section 05 12 00 – Structural Steel Framing: for structural steel.
- B. Section 05 50 00 - Metal Fabrications: for structural metal framing.

1.03 SYSTEM DESCRIPTION

- A. The Theatre rigging system consists of manual counterweight line sets as scheduled on the drawings. Stage draperies include complete set of masking borders, masking legs, bi-parting curtains, and cyclorama.

1.04 QUALITY ASSURANCE

- A. Manufacturing: Products used in this work shall be produced by manufacturers regularly engaged in the manufacture of professional theatre/stage equipment, with a company record of at least ten (10) years continuous production of such equipment.
- B. Installation: The rigging and stage draperies manufacturer shall supply its own stage/theatre equipment installer who shall have at least five (5) years continuous experience with theatre equipment installation with documentation to show successful completion of contracts for projects of similar size, scope and materials.
- C. Field Conditions: Stage rigging installer shall examine all attachment areas and conditions under which the rigging and draperies and tracks are to be installed. Notify Contractor in writing of any conditions detrimental to the proper and timely completion of the work. Work shall not proceed until unsatisfactory conditions have been corrected.
- D. Hoisting Equipment: All hoisting assemblies and cable shall be capable of supporting design loads with a minimum safety factor of 5:1 (Five to One).
- E. Flame Resistance: Stage draperies/curtains shall be certified to be flame resistant per NFPA 701, Reg. No. A-358. Permanently attach label to each curtain indicating that unit is inherently and permanently flame resistant (immersion method), or whether it will require re-treatment after dry cleaning.
- F. Field Welding: Conform to ASME standards. Welders employed to be certified and recertified within previous 6 months for position, rods, and types of steel used in all rigging

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systems.

- G. Code Compliance: All products and work shall be superior or equal to that which is required by governing codes, ordinances, rules, and regulations.
- H. Warranty: All equipment manufactured to these specifications shall be warranted to be free from defects in material and workmanship for a period of two years from the date of substantial completion.

1.05 SUBMITTALS

- A. General: Comply with provisions of General Conditions and Section 01 33 00 – Submittal Procedures.
- B. Manufacturer's Product Data: Submit 2 copies of manufacturer's specifications, installation instructions, and general recommendations for each type of rigging mechanism or drapery track within 30 days after award of contract.
- C. Shop Drawings: Submit shop drawings, including plans, elevations, and detailed sections of typical rigging elements and draperies layouts. Show anchors, hardware, operating equipment and any other components required for complete system. Submit catalog cuts, including part numbers intended for use in this project.
- D. Samples: Submit two 12" square (minimum) samples of each drapery fabric and color required. Color per Architect's color schedule. Submit one only sample (or section of a larger unit) of rigging components and assemblies, including typical drapery tracks, rope, wire, chain, blocks, and locks. Upon approval, samples may be used in the installation.

1.06 DELIVERY, STORAGE AND PROTECTION

- A. Do not deliver rigging components, stage machinery, drapery tracks, or draperies until building is enclosed and ready for their installation. Protect from damage during delivery, handling, and storage. Protect and maintain adjustments per installation specifications following. Transportation of materials and assemblies for this work to and from the job site shall be the responsibility of the stage rigging manufacturer. Delivery, storage, and protection shall also comply with provisions of Section 01 60 00 – Product Requirements.

1.07 WARRANTY

- A. Provide Owner with a written warranty as a condition of work acceptance, signed by contractor and installer agreeing to maintain, repair and/or replace products and materials for one year following Notice of Completion, and without additional cost to Owner, as specified in Section 01 78 30 – Warranties, Guarantees, and Bonds.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS/CONTRACTORS

- A. Professional Standard: In order to establish a standard of quality and performance, the rigging and draperies systems specified shall be as manufactured, supplied, and installed by one of the following:
 - 1. Protech Theatrical Services, 3431 North Bruce St., North Las Vegas, NV 89030,

Phone: (702) 639-0290.

2. Stagecraft Industries, Inc., 5051 North Lagoon Ave., Portland, OR 97217, Phone: (503) 286-1600.
3. Secoa, 8650 109TH Avenue North, Champlin, MN 55316, Phone: (800) 328-5519.

B. Approval requirements for Manufacturers' Dealers or representatives:

1. All equipment and materials specified under work of Section 11 61 43 shall be designed, manufactured and supplied by the approved manufacturer with the exception of miscellaneous hardware.
2. Bids as submitted by Manufacturers' Dealers or representatives shall be signed by the approved manufacturer acknowledging that they have reviewed all theater equipment documents and related drawings.
3. All shop drawing submittals as required under Section 11 61 43, paragraph 1.05 shall be prepared, engineered and signed by the approved manufacturer.
4. All equipment manufactured, supplied and installed under work of Section 11 61 43 shall be warranted to be free from defects in materials, workmanship and installation by the approved manufacturer as required under Section 11 61 43 paragraph 1.04.
5. The approved Manufacturer shall provide an in-house project manager who will be responsible for coordination of work specified under Section 11 61 43 with the Theater Consultant.
6. All operation and maintenance manuals as required under Section 11 61 43, paragraph 3.02 B shall be prepared and submitted by the approved manufacturer.

2.02 MATERIALS AND EQUIPMENT

- A. General: All materials and equipment provided under work of this section shall be new and of first quality with no defects, damages, or blemishes and shall perform as intended to comply with drawings and these specifications.
- B. Counterweight Rigging: Furnish, deliver, and install complete sets of 6-line counterweight rigging, with T-track guide system designed to receive sets on 9-inch centers.
- C. Counterweight Arbor: Arbor shall be single-purchase type fabricated of steel except for guide assemblies. Arbors to be supplied in lengths according to the schedule on the drawings, with top and bottom held parallel with two 3/4-inch steel rods spaced approx. 10 inches on center. Provide one steel spreader plate for each 2 feet or arbor length, with 1-inch steel locking collars and thumb screw at top spreader plate to lock counterweights in position. Provide a 1/4" x 3" flat steel "spine" extending the full length of the arbor, including plastic guide assemblies at each end. Guide assemblies to consist of dense plastic guides with steel back-up plates secured to the arbor "spine" with minimum 3/8" bolts and nuts.
- D. Head blocks: Each underhung head block shall consist of one machine-grooved nominal 12-inch dia. cast iron sheave, with groove of required diameter to eliminate differential motion and slip between operating line and hoist cables, grooved as required for 1/4 inch cable lines

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and one 3/4-inch rope control line. Sheave shall be mounted on sealed roller bearings and supported by solid steel shaft, mounted in a rigid steel housing of two side plates connected with spacers designed to prevent cables or control line from leaving their appropriate grooves

- E. Loft blocks/Idlers: Each under hung loft block shall consist of one 8-inch diameter sheave of Nylon/Molybdenum disulphide material with 1/4-inch wire rope groove, running on two shielded precision ball bearings on 3/4-inch steel shaft. Shaft to be locked on head end with keeper pin and washer and nylon inset locknut on the threaded end, with shaft threads not bearing on side plates. Steel side plates shall be connected with spacers to prevent cable from leaving the groove in the sheave, and side plates shall be slotted for attachment to steel beams up to 8-inch wide flange. Loft blocks shall also carry idlers with correct number of sheaves, according to loft block position, to maintain proper wire rope angles and alignment to the seven pick up points.
- F. Tension Block: Each tension block shall consist of one 10-inch dia. Class 30 grey iron sheave and 2-inch O.D. hub, machine-faced and concentrically bored for installation on precision ball-bearings and solid steel shaft. Sheave shall accept 3/4-inch control line and shall be mounted on a housing consisting of two steel side plates or one-piece cast-iron assembly. Provide guide units composed of high-density polyethylene spacer and guide shoes with steel backing plates and attach to T-track with two 3/8-inch bolts, nuts, and lock washers at each guide unit. Provide one tension block assembly adjustable for precise vertical positioning for each line set.
- G. Counterweights: All counterweights shall be of cast iron or flame cut steel, with no sharp edges or ridges, measuring 4-inches x 13-inches and weighing approximately 14 lbs. per inch of thickness. Provide a total weight of twenty thousand (20,000) pounds, with 70% of that weight in two-inch thick units, and 30% in one-inch thick units. Counterweights required to balance the batten shall be installed in the arbor and painted.
- H. Guide rail System: The T-track system shall include 1-1/2" x 1-1/2" x 3/16" Aluminum J-Bar guides spaced 9-inches on center and extending from stage level to the underside of the head block beams. Tees shall be held parallel and plumb with 2-1/2" x 2" x 7-gauge horizontal punched angle, with die formed perpendicular to the face of the long leg. Tees to be punched for attachment to die-formed tab using 5/16-inch bolt, nut, and lock washers. Horizontal supports and vertical braces shall be five feet on center, both directions. Provide continuous steel stop angle at top and bottom of T-tracks, fitted with min. 2" x 4" wood bumper bolted to the angle with countersunk carriage bolts.
- I. Knee braces shall be secured to stage house wall using appropriate 3/8-inch anchor bolt. Length of knee brace to be determined by contractor based on manufacturer's hardware dimensions and spacing required for plumb operation of counterweight arbor. Tee splices between horizontal shall use two 8-gauge x 3/4-inch plates, with one plate tapped and one punched to receive four 5/16-inch bolts and lock washers spaced 2-inches on center corresponding to hole pattern in tees. Anchor bottom run of horizontal directly to stage floor with appropriate 3/8-inch anchor bolt 5 feet on center or less.
- J. All tees, horizontal angles and knee braces shall be factory jig-punched to allow for field adjustment and alignment of tee-bar system for absolute minimum friction.
- K. Locking Rail: Provide a complete locking rail assembly at stage level consisting of 3-inch x 3-inch x 1/4 min. dimension continuous steel angle supported 30-inches above the stage floor with minimum 4-inch x 3-inch structural steel angle uprights located not more than 12

inches from each end and not more than 5 feet on center. Provide diagonal bracing perpendicular to the locking rail and anchored to the concrete stage sub floor. Drill or punch the locking rail to receive rope locks at 9-inches on center, spaced in relation to the proscenium wall as shown on the drawings.

- L. An index cardholder of 3-inch x 1/4-inch flat strip shall run the full length of the locking rail, with cardholders mounted at a 45-degree angle to the locking rail top. Furnish and install index cards with set numbers in sequence stenciled in 1-inch high letters.
- M. Rope Lock: Rope lock components shall be of heavy-duty Class 30 grey iron castings, with two jaws mounted inside a one-piece housing of min. 5/16-inch wall thickness secured with 1/4-inch hex bolt and locknut. Locking action supplied to onstage jaw by approx. 7-inch long cast iron handle with cam base, fitted with 1/4-inch dia. welded steel retainer ring. Pressure adjustment on offstage jaw shall be by 3/8-inch thumb screw with jam nut. Rope lock for each line set shall be attached at each locking rail with four hex bolts, nuts, and lock washers.
- N. Pipe Battens: Single pipe battens and truss battens and truss battens shall be constructed of 1 1/2-inch I.D. Schedule 40 black steel pipe, with 1-9/16-inch x 120-inch x 24-inch long internal sleeves and 4-3/8"-inch bolts, nuts and lock washers where required for attaching pipe sections together, otherwise sleeved and plug welded. Fabricated truss-type battens with welded steel rods with panel points at 2 ft. 0 in. on center structurally detailed by contractor. Number of each type of batten shall be as per schedule and drawings.
- O. Wire Rope: Wire rope cable used for lead lines of all counterweight sets shall be 1/4-inch x 7 x 19 galvanized aircraft cable having a minimum breaking strength of 7,000 pounds. Each line set shall have (7) cable pick-ups, attached to the batten per drawings. All cable attachments to any bracket, turnbuckle, or lug shall employ properly sized thimble and cable loop secured with three cable clips or one Nicopress-type sleeve installed per manufacturer's instructions.
- P. Hand Control Lines: Each line set will be operated by means of a 3/4-inch diam. 3-strand composite polyester rope. MULTILINE II rope or equal. The rope shall be attached to the top of the counterweight arbor, up around the head block, down through the rope locks, around the tension sheave, and terminate at the eye bolt at the arbor bottom. Seize and tape all rope ends.
- Q. Lighting Strip: A continuous lighting strip shall be provided over the stage floor locking rail, attached to the T-track assembly and braced to the stage house wall at upstage and downstage ends. Fabricate with 60-watt bulbs/receptacles at 24-inch intervals with power connected to J-box provided by electrical contractor at downstage end. Provide scenery stacking rail fabricated of 1-1/2-inch I.D. pipe as indicated on the stage house section.

2.03 DEAD HUNG PIPE GRID

A. General:

1. Provide pipe grid constructed from 1-1/2" I.D. schedule 40 iron pipe. Splice all joints using 18" long sleeves extending 9" into each pipe. Connect joints using two 3/8" diam. bolts on each side of the splice. Install grid with pipe spacing as indicated on drawings. Connect all intersections using 1-1/2" Rota-lock fittings.
2. Terminate each pipe approx. 1" from perimeter walls. Provide pipe sleeved wall plates to secure ends of pipes. Anchor ends of pipes to wall sleeves using two 3/8" diam. bolts. Provide sufficient backing plate at wall as required for wall plate anchorage.

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3. Suspend grid from overhead steel structure using minimum 1/2" diameter threaded rod.

2.04 STAGE DRAPERIES / MATERIALS AND EQUIPMENT

- A. Fabrics: Velour shall be min. 54" wide material, 100% cotton velour, 21 oz. or 25 oz. as indicated on drawings and schedule, fully flame proofed, color per Architect's color schedule. Velour shall be manufactured with not less than 40 backing ends per inch, 40 pile ends per inch, 32 picks per inch, and 640 pile tufts per square inch; medium weight velour to have pile ht. of 100 mils or more, heavy weight velour to have pile ht. of 125 mils or more. All velour curtains shall be made with nap down. Seamless muslin shall be sheer, plain woven fabric, natural color, 100% uncombed cotton, 128 per inch thread count, fully flame proofed.

- B. EXISTING CURTAINS

All curtains are existing. Remove existing curtains, Clean and apply new fire proofing in accordance with CBC 806.4.

- C. Tracks: Drapery tracks shall be steel, not less than 14-gauge galvanized roll-formed, with continuous bottom slot and with each half of track in one continuous piece. Provide curtain carriers for track spaced at 12 inches on center. Equip track with live end double pulley and dead-end single pulley each with 4-inch nominal cast iron wheels on ball bearings, enclosed in steel housing. Provide curtain carriers of molded nylon with pairs of polyethylene, ball-bearing wheels riveted parallel to body. Equip carriers with neoprene or rubber bumper, heavy duty swivel eye, and trim chain for attachment of curtain snap or Shook. Provide end stops for track and adjustable floor block designed to maintain proper tension on 3/8-inch stretch-resistant operating line of braided polypropylene or fiberglass center cord. Track shall provide min. 2-foot center overlap.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Inspection/Preparation: Prior to fabrication and installation, stage equipment contractor shall verify field dimensions and structural capabilities at attachment areas per job conditions. Stage rigging systems shall not be installed until all backstage areas are finished and painted.
- B. Operating Effectiveness: Install all hardware components and rigging assemblies so that all equipment is plumb, parallel, and completely free of unnecessary friction.
- C. Quality Control: Coordinate with other trades as required. Repair or replace any damaged units as directed by the Architect/Theatre Design Consultant. Provide protection for installed rigging, draperies, and related units so as to be in perfect operating condition without damage or blemishes upon completion of construction.
- D. Draperies: All draperies over 10 ft. in height shall be hung on scenic frames for 24 hours prior to insertion of hems, to avoid improper stretching. Secure curtains to battens with 3/8-inch manila tie lines, nylon line, or No. 6 sash cord, all doubled.
- E. Turnbacks: Where specified, provide drapery turnbacks formed by folding 18-inches of material back at end of panel, and securing by sewing across top hem only, and grommeting through both layers of material. Do not sew turnbacks vertically.
- F. Tracks: Install drapery tracks at locations shown on plans, in accordance with manufacturers recommendations. Install level, plumb, and secure to appropriate batten with track to-batten clamps.
- G. Rigging Installation, Miscellaneous: Bolts, nuts, washers, etc., shall be galvanized or similarly plated. Cable clips shall be tightened before loading and then torqued to manufacturers specifications when cable is under load. Dead ends of all wire ropes shall be taped snug against the live end whenever cable clips are used. Compressible fittings shall be crimped exactly according to manufacturer's recommendations as to quantity and spacing of crimps. Trim dead end of cable to within 1/2-inch of swag and short dead end of cable. Only copper sleeves shall be used; aluminum is not acceptable. All turnbuckles shall have jam nuts. All cable or rope connections that terminate around a sharp edge or bend shall pass around proper steel thimbles. All loft blocks, head blocks, idler pulleys, and tension sheaves shall be aligned after assembly to bring friction to absolute minimum and assure cable leads do not rub sides of grooves, plates, or any structure. All bearings on head blocks, loft blocks, and sheaves shall be greased at assembly and sealed with proper grease-retaining seals after assembly.

3.02 SYSTEMS TESTING AND DEMONSTRATION

- A. After all stage equipment installation is completed, a representative of the contractor shall thoroughly test all systems for correct, smooth, and safe operation and then demonstrate the operation of each part of the system for owner's personnel or representative.
- B. Provide operation and maintenance manual, consisting of manufacturer's maintenance catalogs, operation and safety/maintenance recommendations, and as-built drawings or diagrams. In delivering these materials and as part of final system demonstration, the contractor's representative shall generally instruct owner's personnel as to proper system operations and maintenance. Allow for availability of contractor's representative for a minimum of two consecutive working days for demonstration purposes.

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3.03 CLEAN-UP

- A. Upon completion and resolution of all punch list items, the stage equipment contractor shall inspect the entire installation and clean all surfaces and areas to remove any dirt, marks, and all extraneous construction or packing materials and leave the complete installation in clean, fully lubricated, finished operating condition.

END OF SECTION

13 00 00

SPECIAL CONSTRUCTION

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SECTION 13 08 00

SOUND CONTROL DOORS

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide sound control door and frame assemblies where shown on the Drawings, as specified herein, and listed on the Door Schedule. The work includes door and frame assemblies complete with acoustical seals, cam-lift hinges, and all finish hardware factory supplied and installed. Door leaf and frame is factory assembled and shipped complete as one unit.
 - 1. Where scheduled, provide sound control doors labeled and listed to meet the fire ratings indicated.
- B. Related Sections:
 - 1. Section 04 22 00: Concrete Unit Masonry.
 - 2. Section 08 71 00: Door Hardware.
 - 4. Section 08 11 13: Hollow Metal Doors & Frames.
 - 5. Section 09 29 00: Gypsum Board.
 - 6. Section 09 90 00: Painting and Coating.

1.02 SYSTEM PERFORMANCE REQUIREMENTS

- A. Sound Rating: Provide door and frame assemblies that have been fabricated as sound-retardant units, tested according to ASTM E90 and have the following certified Sound Transmission Class (STC) rating as determined according to ASTM E413.
 - 1. STC Rating 64

1.03 SUBMITTALS

- A. Comply with pertinent provisions of the Contract and Division 1.
- B. Product Data: Within 20 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Material lists of items provided under this Section.
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - 3. Shop Drawings showing details of each frame type, elevations of door designs, details of openings, and details of construction, installation and anchorage.
 - 4. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.

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5. Test Reports from a qualified independent testing agency indicating and interpreting test results from Part 3 of this Section relative to compliance of sound ratings with the indicated requirements.
6. Material certificates in lieu of laboratory test reports when permitted by Architect signed by the manufacturer certifying that each sound control door complies with the project requirements,

1.04 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Acoustical Performance
 1. The acoustical door manufacturer will be required to submit acoustical performance data in the form of up-to-date test reports from an independent testing laboratory indicating the doors to be provided will have the required Sound Transmission Class Rating (ASTM E90).
 2. For the required STC rating, refer to door schedule drawing.
 3. Owner may at his option order performance tests of installed door assemblies by an independent consultant to verify compliance with the specifications. Any discrepancies shall be repaired or replaced without cost to the Owner.
- C. Single-Source Responsibility: Provide sound control doors and frames, including gaskets, hinges and other hardware items essential for sound control as an assembly and by a single firm specializing in producing this type of work for a minimum of ten (10) years.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Use all means necessary to protect the materials of this section before, during and after installation and to protect the installed work and materials of all other trades.

1.06 WARRANTY

- A. Acoustic door materials and hardware shall be guaranteed against defective workmanship for one (1) year from Notice of Completion, as per Section 01 78 30 – Warranties, Guarantees, and Bonds.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturer: Noise Lock acoustic door(s) and frame(s) with cam lift hinges and split frames as manufactured by Industrial Acoustics Co, Inc (IAC), 1160 Commerce Avenue, Bronx, NY 10462, Phone: 718-931-8000, Fax: 718-863-1138.
- B. Equivalent Manufacturers: The Huff Company, 2001 Kelley Court, Libertyville, IL 60048, Phone: 847-362-7440, Fax: 847-362-0427; and Overly Manufacturing Company, 1551 Woodward Road Extension, Greensburg, PA 15601, Phone: 724-834-7300.

2.02 MANUFACTURED ASSEMBLIES

A. Door leaf(s) minimum thickness:

STC 64 Rating, 5" (127 mm)

Door leaf(s) and door stiffeners are to be fabricated from 14 gauge (2 mm) cold rolled, galvanized steel with an A60 coating weight, and filled with 6 lb density, sound absorbing, and damping elements.

B. Frame(s) shall be fabricated from 14-gauge cold rolled, galvanized steel with an A60 coating weight and furnished "split" in two (2) pieces, inside and outside, that are mitered and welded together allowing for easy installation into either existing or new construction openings.

C. Acoustic seals: Doorjamb, meeting stiles of double doors and at the head of the door and frame shall receive self-aligning magnetic, [fire resistant (if UL rated)] compression seals. Door(s) to be held in closed position by magnetic force of perimeter seals.

Acoustic labyrinth shall be created when door is in closed position. Bottom of door leaf shall contain continuous, adjustable, gravity-activated seal that shall compress against the floor as the door is closed. Raised sills and threshold drop seals will not be acceptable.

Acoustic Seal assemblies as follows: STC 64, Magnetic tri-seal type

D. Jamb anchors: Provide jamb anchors as determined by wall construction. Anchors are to be spaced at 12" (305 mm) on center (max) and are to be of a corrosion resistant material.

E. Hardware

1. Hinges: IAC, cam-lift, butt-type, hinges, US26D finish (Hinge manufacturer to furnish laboratory test data certifying that hinges of identical design have been cycled a minimum of 125,000 times while supporting a door leaf weighing a minimum of 350 lbs.)

For door leaf thickness greater than 2 ½" (64):

Three (3) hinges required per leaf for openings up to and including 96" (2438 mm) high

Four (4) hinges required per leaf for openings up to and including 120" (3048 mm) high

2. Closers: "LCN" or "Norton", factory installed.
3. Pull Handles: 1" (25 mm) diameter x 9" (229 mm) overall length, 3" (76 mm) projection, US28 finish, factory installed.
4. Push Plates: 4" (102 mm) wide x 16" (406 mm) high x .050" (1 mm) thick, US32D finish, factory installed.
5. Flushbolts: "Glynn-Johnson", surface mounted to inactive leaf, top & bottom (used on double leaf doors). Factory installed.

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6. Coordinators: "Dorma" (used on double leaf doors when both leaves need to be active). Factory installed.

F. Hardware Reinforcement

1. Hinges: Minimum of 1/4" (6 mm) thick x 2" (51 mm) wide x 7 1/2" (191 mm) lg.
2. Frames: Minimum of 3/16" (5 mm) thick for strikes and #11 (3 mm) gauge for closers.
3. Doors: Minimum of #11 (3 mm) gauge for lock boxes and closers.

G. Fire Rating: Those openings scheduled, as fire rated, shall have been tested by and bear the labels of Underwriters Laboratories marked for:

1. 3 hour, "A" label
2. 1 1/2 hour, "B" label
3. 1 hour, "B" label
4. 20 minute, "D" label

H. Glazing

1. Non-Fire Rated: Provide factory-installed, aluminum extruded stops and moldings with true mitered corners for double, glazed assemblies. Size of vision lite is to be determined from the door schedule. Safety glass or fire-resistive glazing product meeting doors' sound control and labeling requirements is acceptable.
2. Fire Rated: Provide factory-installed, formed steel stops and moldings with true mitered corners for double, glazed assemblies. Size of vision lite is to be determined from the door schedule in conjunction with any UL requirements. Wire mesh, glass clad laminate or fire-resistive glazing product meeting doors' sound control and labeling requirements is acceptable.

2.03 PRE-HUNG

- A. Assembly and adjustment of door leaf, frame, acoustic seals, hinges and associated finish hardware shall take place at the factory to insure ease of installation, reliable operation and acoustic performance. The entire manufactured assembly shall be shipped to the job site ready to install and operate.

2.04 FABRICATION

- A. General: Fabricate units to be rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Wherever practical, fit and assemble units in the manufacturer's plant. Identify work that is not permanently factory-assembled before shipment to ensure proper assembly at the Project site. Weld exposed joints continuously: grind, fill dress and make smooth flush and invisible.

2.05 FINISHES (FACTORY)

- A. Doors and frames shall receive a shop coat of a rust-inhibitive primer. The primer shall be applied over properly prepared metal, in accordance with the manufacturer's standard shop prime coat procedure and oven-baked dry.

- B. Others, as required, will perform finish painting, staining and/or varnish, under the painting section 09 90 00 of this Specification.
- C. Oak, mahogany, birch, cherry, maple or walnut] paper-backed, wood veneer shall be applied as a finish, on [one, both] side(s) of the doors: [list doors requiring wood veneer]
Note: A maximum of a 1 hour UL rating is available with wood veneer door assemblies.

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions.

3.02 PREPARATION

- A. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.
- B. Adjacent Construction: Coordinate door assembly details with details of adjacent work to ensure proper attachments and clean junctions.

3.03 INSTALLATION

- A. Install work in accordance with reviewed shop drawings and these specifications using only factory-trained personnel as required by the Manufacturer and approved by the Architect.
 - 1. Hang doors and adjust for free swinging operation without binding, sticking, sagging or excessive clearances.
 - 2. During installation, solidly pack acoustic insulation around frames that are installed in stud and gypsum-wallboard partitions.
 - 3. Caulk exterior joint prior to painting.
 - 4. Install sound control door assemblies during finish phase of construction to protect units from damage.
 - 5. When installation is otherwise complete, adjust operating hardware for proper operation and function.

3.04 FIELD QUALITY CONTROL

- A. Upon completion of this portion of work, and prior to its acceptance by the Owner, secure a visit to the job site by a qualified representative of the manufacturer of the acoustical door system(s) to confirm that installation is in conformance with the manufacturer's recommendations.

3.06 DEMONSTRATION

- A. Instruct the Owner's maintenance personnel regarding operation and maintenance of all acoustic doors.

END OF SECTION

14 00 00

CONVEYING EQUIPMENT

LAKESIDE UNION SCHOOL DISTRICT

SECTION 14 42 00

WHEELCHAIR LIFTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Modification of existing wheelchair lift.

1.02 REFERENCES

- A. Comply with the American National Standard Safety Code for Elevators and Escalators which includes requirements for Elevators, Escalators, Dumbwaiters, Moving Walks, Material Lifts, and Dumbwaiters with Automatic Transfer Devices, ASME A17.1.
- B. Comply with California Code of Regulations, Title 8, and California Building Code (CBC), Title 24, Part 2, Chapter 30.

1.03 DESIGN REQUIREMENTS

- A. All wheelchair lifts shall comply with California Building Code, Sections 11B-206.7 and 11B-410, and section 3094, of Title 8, Division 1, Chapter 4, Subchapter 6, California Code of Regulations (2019 C.E.S.C.C.) which include, but are not limited to, the following:
 - 1. Provide clear landing at each level 60" x 60" per CBC 11B-410.7. Provide spot elevations at landings. Existing. See plan.
 - 2. Gates and doors serving lifts shall meet the requirements of CBC 11B-206.5 and 11B-404.1. Existing. See plan.
 - 3. Provide 36" x 48" min. (36" x 51" preferred) clear platform for straight through access and 42" x 60" minimum clear platform for "corner", or side access lifts. At 3-way lift provide power door/gate operators. Existing. See plan.
 - 4. Provide smooth and solid platform enclosure. Existing. See plan.
 - 5. Upper landing and lift doors 42" high. Doors shall be self-closing. Existing. See plan.
 - 6. Provide and indicate location of "call/send" controls and access, minimum 24" away from any moving part, complying with requirements of CBC Section 11B-309. Provide new controls as part of this contract.
 - 7. Provide a wand or other reaching device attached to a chain on the side opposite the controls or provide accessible controls on both sides of the car. Provide in this contract.
 - 8. Provide pit for flush access at lower landing. Existing. See plan.
 - 9. Provide battery backup power at lift to emergency exit from platform/upper level, per CBC 11B-207.2. (5 Full Cycles). Provide Lev Elevator 110 volt replacement Battery Backup Unit. p/n 2154901 For Emergency Lowering.

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1.04 SUBMITTALS

- A. Comply with the requirements of Section 01 33 00.

- C. Shop Drawings: Submit shop drawings for wheelchair lifts showing general arrangement, loads of the equipment, relationship to adjacent construction for each place of installation, space requirements, dimensioned locations of wiring connections, and other features required for proper installation and operation of the lifts. Required shop drawings to include (but not be limited to) the following:
 - 1. Wand, or other reaching device, attached to a chain on the side opposite the controls, or, provide controls on both sides of the car. **Show New.**
 - 2. Pit - for flush access at lower landing or landing at the same level of the platform with a max. slope of 8.33% to access. Show existing.
 - 3. Smooth solid platform enclosure. Show existing.
 - 4. Doors and gates to have the following:
 - a. Level floor or landing. Show existing.
 - b. Required maneuvering clearance. Show existing.
 - c. Width of level area on side to which door or gate swing extends 18 inches (457 mm) past the strike edge of door or gate for interior doors and 24 inches (610 mm) for exterior door or gate. Show existing.
 - d. Maximum effort to operate doors or gates shall not exceed 5 lbs. (22.2 N). **Confirm existing.**
 - e. If door or gate has a door closer: Sweep period for closer shall be adjusted so the from an open position of 70 degrees, the door will take 3 seconds to move to a point 3 inches (76.2 mm) from the latch, measured to the landing edge of the gate. **Confirm existing.**
 - f. Hand activated door or gate opening hardware to be centered between 30-44 inches (762-1,176 mm) above finish floor. Show existing.
 - g. Hand activated door or gate opening hardware operable with a single effort by lever-type hardware, push-pull activating bars or other hardware designed to provide passage with requiring the ability to grasp the opening hardware. **Confirm existing.**
 - h. Bottom 10 inches (254 mm) of all door or gates (except automatic sliding) to have smooth uninterrupted surface. Show existing.
 - i. 42-inch (1,067 mm) min. high lift and upper landing doors. Show existing.
 - j. Doors to be self-closing. **Confirm existing.**

- 5. Platforms:
 - a. 36 inch by 48-inch (914 mm by 1,219 mm) min. clear platform for straight thru access. Show existing.
- 6. Clear, level landing at each level. Show existing.
- 7. Platform floor, ramp, and dock plate to be slip-resistant. Show existing.
- D. Product Data: Submit manufacturer's catalog data, specifications, and other data for wheelchair lifts modifications as necessary to demonstrate compliance with these specifications. Provide printed installation instructions and general recommendations for the lift unit specified.
- E. Maintenance Data: Submit manufacturer's maintenance and service data, including address and telephone number of nearest authorized service representative.

1.05 QUALITY ASSURANCE

- A. Products and materials to be provided are to be from manufacturers and producers regularly engaged full-time in the manufacture or production of this and similar items, with a five (5) year history of successful manufacture or production acceptable to the Architect.

1.06 GUARANTEE

- A. Provide a written guarantee, as a condition of work acceptance, agreeing to maintain, repair, and /or replace defective products and materials. Manufacturer shall warranty the lift for a period of 5 years after installation with a purchase of a Preventative Maintenance Program from the Lift Contractor for an equal number of years at no additional cost to the Owner. Guarantee shall comply with Section 01 78 30 – Warranties, Guarantees, and Bonds.

PART 2 - PRODUCTS

2.01 WHEELCHAIR LIFTS

- A. Existing Design Characteristics:
 - 1. Travel: From ground floor to platform.
 - 2. Rated Capacity: Not less than 650 pounds (as per Title 8 section 3094).
 - 3. Rated Speed: Not less than 8-feet per minute, nor more than 10 feet/minute.
- B. Existing Drive Mechanism: Screw Type with safety device to prevent uncontrolled descent in the event of failure of the drive mechanism. The lift assembly shall be securely supported to maintain the platform in a level position and to prevent the loosening or displacement of any portion of the unit. All portions of the lift machinery shall be protected from intrusion of water.
- C. Existing Motors: Instant reversing type designed for operation on 115-volt, single phase alternating current, rated not less than 1/3 horsepower and operating speed not to exceed 1750 RPM.
- D. NEW Controls:

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1. Operating Controls: Provide up/down constant pressure operated paddle type switch, on/off switch, alarm button and emergency stop button mounted on each side of the platform for wheelchair users. New in this contract.
 2. Call-Send Controls: Provide call-send stations at location easily accessible to wheelchair users at each landing. Each control station shall include paddle type switch, and emergency stop button. New in this contract.
 3. Control stations shall be low voltage type operating on not more than 24 volts. Controls shall be no higher than 4'-0" above floor and no lower than 2'-11" above floor.
 4. Controls for lifts shall comply with CBC Section 11B-309.
 - a. Operation of lifts from the landings and from the platforms shall be controlled by control switches at all stations, and shall be by means of the continuous-pressure type.
 - b. Controls shall be 48" max. and 15" min. above the platform floor or facility floor or ground level.
 - c. Operating devices shall be designed so that both the "UP" and "DOWN" circuits cannot be operated at the same time. ASME A18.1 Section 2.10.1.
- E. Existing Brakes: A mechanically applied, electrically released brake shall positively and accurately stop the platform, without coasting, when control buttons are released.
- F. Safety Devices:
1. Provide up and down limit switches with a back-up final limit switch that will cut power to the lift in the event of failure of regular limit switches.
 2. Provide underside of the platform with an under-panel with sensors that will stop downward travel should an obstruction be encountered.
 3. Provide for manual lowering of the platform in case of power failure.

MODERNIZATION PROJECTS

- G. Platform Size: Platform shall have a minimum of 12 square feet net usable area inside the barriers. Platform shall be minimum 36" x 48" clear. for straight through access, and 42" x 60" clear for "corner" or side access lifts. Platform shall have a non-skid surface.
- H. Access Ramp: Provide a ramp which locks in the up position to serve as a guard when the platform is in motion and folds down automatically to provide access to the platform at the lower level. Rise of ramp shall not exceed 8.33%. Pit shall be provided for new construction to provided flush condition.
- I. Platform Side Panels: Provide 42-inch-high metal covered composite panels.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install wheelchair lift in accordance with the shop drawings, manufacturer's instruction and ANSI/ASME A17.1, and CBC 2019, Sections 1607A.8 and 1613A, using force factors for flexible equipment when unit is in its elevated condition.
- B. Clean and adjust and lubricate equipment in accordance with manufacturer's instructions. Test operation in the presence of the Architect and adjust for smooth operation prior to acceptance.

END OF SECTION

22 00 00

PLUMBING

LAKESIDE UNION SCHOOL DISTRICT

SECTION 22 01 00

PLUMBING GENERAL PROVISIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide items, articles, materials, operations and methods listed, mentioned and scheduled on drawing and specifications, including labor, material, equipment or fixtures, and incidentals necessary or required for the completion, testing, inspection, adjusting, re-testing and readjusting to provide the various systems operable and complete in all respects.
- B. Provide fixtures and equipment which have been listed in the Material Standards by School District.

1.02 RELATED SECTIONS

- A. Section 22 07 00 Plumbing Insulation
- B. Section 22 20 00 Plumbing Systems

1.03 DRAWINGS AND SPECIFICATIONS

- A. Examine and become familiar with all project drawings and sections of the specifications, and coordinate the work accordingly. Make reasonable modifications in the layout and installation as needed to prevent conflict with work of other trades and for proper execution of the work, without additional cost.
- B. The drawings indicate approximate locations of equipment, fixtures, piping, etc., however, prior to ordering any equipment, fixtures or materials, or performing any work, all dimensions, locations, and clearances shall be verified by the Contractor, based on actual field conditions, following the necessary coordination with other trades.
- C. The substitutions of equipment or fixtures may not be the same as that which was used as a basis for design. The term substitutions only refers to items listed in our specification that are not used as the basis of design on our drawings. Provide all necessary revisions to the installation, or work of all other trades to accommodate the substituted equipment or fixtures, maintaining comparable clearances and provisions for maintenance shall be provided, with all related costs, by the Contractor. Submit substituted working drawings and submittals that have been coordinated with all other associated trades, showing the proposed installation.
- D. It is the intention of the specifications and drawings to call for finished work, tested and ready for operation.
- E. Where any device or part of equipment or fixtures is herein referred to in the singular number, such reference shall be deemed to apply to as many such devices as are required to complete the installation or as shown.

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1.04 SUBMITTALS - SHOP DRAWINGS/PRODUCT DATA/MATERIAL CERTIFICATIONS

- A. Submittals shall include six copies of all shop drawings, product data and material certifications for the project. These submittals shall be sent to the School District Representative.
- B. School District Representative will review the shop drawings, product data and material certifications for the project. Do not fabricate pipe or order any equipment or fixtures without shop drawings and product data being approved. All pipe systems, equipment, fixtures and other accessories require submittal review.
- C. Shop drawings, product data and material certifications shall be complete in every respect so that a thorough review and evaluation can be performed. All required shop drawings, product data and material certifications shall be submitted at one time. Incomplete submittals, those without shop drawings, those that are not prepared properly, or submittals with less than the required number of copies, shall be returned for resubmittal.
- D. It is intended that only a one-time review of all shop drawings and submittals will be performed.
- E. All shop drawings, product data and samples submitted by the Contractor shall illustrate details of work, equipment, fixtures, materials, products, systems, designs or workmanship that the Contractor intends to use in order to comply with the design concept established in the contract documents. The review of these submittals is only for the limited purpose of checking the same for conformity with the design concept of the work as established in the contract documents. The review is not intended to be for the purpose of determining the accuracy of other matters that may be contained in such submittals, including but not limited to such matters as dimensions, quantities and performance of equipment. Contractor shall furnish construction means, methods, techniques, sequences, procedures or safety precautions, the correctness of which as set forth in the contract documents or submittal shall be the sole responsibility of the Contractor.
- F. Only equipment, fixtures, material and components of those manufacturers indicated in this specification are acceptable. Products that have not been reviewed and accepted by the School District Representative before the bidding period will not be accepted.

To be considered as a acceptable confirm that the alternate manufacturers' equipment or fixture is comparable with regard to such features as noise level, power requirements, metal gauges, vibration attenuation, finish, appearance, certification of recognized testing agencies and standard bureaus, allowable working pressures, physical size and arrangement. The Contractor shall also consider the effect of installation in the available space, factory-applied insulation, electrical devices, controls, access to internal parts, operating efficiencies, and all other features and capacities specified herein. The School District Representative shall be the judge of the ability of any equipment, fixture or material to meet the requirements of this specification and the burden of proof shall be the responsibility of the Contractor.
- G. Format: Each type of equipment, fixture or material shall be submitted in a separate section of the submittal package and each such section shall have:

- H. A cover sheet identifying the equipment or fixture by the numbers or letter identical to those listed on the Drawings and/or Specifications, the manufacturer, the model number and size, and the technical data required for each piece of equipment or fixture. Materials shall be identified by system type.
- I. Dimensional drawings (including optional accessories appropriate to this project).
- J. Electrical data tables showing voltage, phase, horsepower (or kW), full load (or rated load) amperes and maximum fuse protection for each piece of equipment.
- K. Capacity data tables.
- L. Each submittal shall specifically reply to every item of equipment, fixture or material specified or scheduled. All information shall be listed on the submittal cover sheet and shall be marked in the submitted manufacturer's literature. All exceptions to the individual specifications shall be listed separately on the submittal cover sheet and shall be noted on submittal "cut sheet".
- M. Shop drawings are required for the plumbing systems. Submit one set of original drawings suitable for reproducing clear copies and provide six copies of drawings. The shop drawings will be reviewed. Contractors shall reproduce copies for their use. Shop drawings, equipment, fixture and material submittals shall be delivered at the same time.

1.05 INVESTIGATION OF CONDITIONS

- A. 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 damage 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 it the independent locating service before start of construction to determine location of existing utilities.
- B. This project is on an existing site with existing utilities and an examination of the site is mandatory.
- C. Examine the existing conditions bearing on labor, transportation, handling and storage of materials, etc. Visit the site to understand the nature and scope of all work to be performed. The submission of a bid will be taken as evidence that such an examination has been made and all conditions have been considered.

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1.06 EXISTING INSTALLATION AND CONFLICTS

- A. Existing active services, water, sewer, electric, other piping systems, when encountered, shall be protected against damage due to construction work. Do not disturb operation of active services that are to remain.
- B. If existing active services are encountered which require relocation, make request to the School District Representative for determination of procedures. Where existing services are to be abandoned, they shall properly terminate in conformance with requirements of the School District Representative.
- C. If work makes temporary shut-downs of services unavoidable, consult with School District Representative as to dates, procedures and estimated duration of shut-down period in advance of the date work is to be performed.
- D. Work shall be performed to assure that the existing operating services will be shutdown only during the time allowed and required to construct necessary connections. If a system cannot be shutdown, temporary bypass jumpers shall be installed until connections are complete.
- E. Be responsible for all costs incurred by the above shut-downs, including bypass or jumper installations for work performed under Division 22.
- F. If existing active utility services are encountered which require relocation, make request to School District Representative or other proper authorities for determination of procedures. Where existing services are to be abandoned, they shall properly terminated and capped.

1.07 ORGANIZATIONS

- A. Below is a list of organizations that may be identified throughout the specifications by the letters in parenthesis only.
 - 1. American Society of Mechanical Engineers (ASME)
 - 2. American Society for Testing and Materials (ASTM)
 - 3. American Water Works Association (AWWA)
 - 4. Factory Mutual Laboratories (FM)
 - 5. National Electrical Manufacturer's Association (NEMA)
 - 6. Underwriters' Laboratories, Inc. (UL)
 - 7. American National Standards Institute (ANSI)

1.08 DEFINITIONS

- A. Furnish: To purchase and supply equipment, fixtures, materials or components and deliver to the jobsite.
- B. Install: To place, fix in position, secure, anchor, etc., including necessary appurtenances and labor so the equipment, fixtures or material of the installation will function as specified and intended.
- C. Provide: To furnish and install.
- D. Piping: Includes, in addition to pipe, all fittings, flanges, valves, hangers, and other accessories related to such piping.

- E. Concealed: Means hidden from sight in chases, furred spaces, shafts, hung ceilings, or embedded in construction.
- F. Exposed: Means not installed underground or "concealed" as defined above. Tunnels, trenches, attic spaces and crawl spaces are considered exposed.
- G. Accepted/Acceptable: Items, that in the opinion of the School District Representative, are acceptable alternates for the item specified.

1.09 CODE, PERMITS AND FEES

- A. The drawings and specifications take precedence when they are more stringent than codes, ordinances, standards and statutes. Codes, ordinances, standards and statutes take precedence where they are more stringent than the drawings and specifications.
- B. Secure and pay for permits, tests, Certifications of Inspection, and all other costs incidental to the work.

1.10 GENERAL COORDINATION OF WORK AND WORKING PROCEDURES

- A. All equipment, fixtures and materials shall be covered or otherwise protected from the weather, theft, etc., both when stored on the site and after installation, until final acceptance by the School District Representative. All open ends of installed piping for partially completed systems shall temporarily be plugged and capped.
- B. All materials of construction shall be new and shall bear the manufacturer's labels and trademarks.
- C. The specifications indicate general requirements for the installation of all equipment, fixtures and materials however, follow the specific instructions and directions furnished by the equipment or fixture manufacturer.
- D. All equipment or fixtures shall be installed with full consideration of future maintenance. Equipment or fixtures that are installed such that it cannot be readily serviced shall be removed and installed correctly as directed to facilitate servicing.
- E. Unions, valves, and other components that may require lubrication or maintenance shall be located to provide sufficient accessibility. When necessary, provide access doors as hereinafter specified at all locations where these items are concealed within walls, chases, or above ceilings which do not have an inherent accessibility feature.
- F. Prior to testing clean and flush all piping systems.
- G. Surfaces to be painted shall be wiped, scraped, or wire-brushed as necessary to a clean, smooth painting surface, free from oil, rust and dirt. All material and equipment that is furnished with a factory prime coat of paint, which is damaged in transit, during storage, or from exposure to weather, shall be prime painted.
- H. Contractor shall be responsible for costs related to damage caused by leaks in piping systems, or any other malfunction of the equipment, fixtures, materials, systems, or work, including repairs, replacements, etc.

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- I. Contractor shall provide information to other Contractors relative to all required pipe penetrations in walls, floors, roofs etc. The Contractor shall provide information to other Contractors relative to heights of piping systems. Structural work shall not be altered in any way.
- J. All necessary cutting and patching of roofs, walls, floors, ceilings, etc., as required for the proper installation of the work under this section, shall be performed, and in a neat and workmanlike manner. No joists, beams, girders, columns, or other structural member shall be cut.
- K. Contractor to provide all scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises for all equipment, fixtures and materials, and remove same from premises when no longer required.
- L. Carefully lay out work on the premises and make proper provision for the other work. The exact location of each item shall be determined by reference to the drawings, by measurements at the building, and in cooperation with other contractors. Be responsible for accurately locating all openings for pipes, etc., and all access doors required.
- M. Schedule and coordinate work so as to execute expeditiously the contract and to avoid unnecessary delays.
- N. Examine fully the specifications and drawings for other trades, to become familiar with all conditions affecting work, and consult and cooperate with other trades for determining space requirements and adequate clearances with respect to other equipment in the building.
- O. If the work is installed without coordinating with other trades, and the installation interferes with their installation, the contractor shall make any changes necessary in this work to correct conditions without extra charge.

1.11 ELECTRICAL

- A. Coordinate the voltage and phase characteristics of each electrical item such as electrical water heaters, fixture electrical sensors and motors with the electrical shop drawings.
- B. NEMA Standards shall be taken as minimum requirements for design and performance.
- C. Motors shall be suitable for load, duty, voltage, frequency, hazard and for service and location intended. Motors shall be high efficiency type. Motors shall have name plate giving manufacturers name, shop number, HP, RPM and current characteristics.

1.12 MOTOR STARTERS

- A. Provide motor starters for all plumbing equipment. Provide correct size and voltage characteristics per electrical requirements. Motor starters shall be provided by Division 22 and coordinated with electrical drawings.

1.13 EQUIPMENT SUPPORTING PROVISIONS

- A. Contractor shall confirm locations with School District Representative before installation of hangers, platforms, equipment frames, etc. Contractor shall coordinate all related work with other trades.

- B. Equipment schedules on the drawings indicate a particular manufacturer for all equipment and the architectural and structural drawings indicate supports and other design considerations which were based on the use of this equipment.
- C. Contractor shall confirm all support dimensions and locations based on the actual equipment to be installed and shall coordinate all related work with other Contractors.
- D. Where supports, foundations, stands, suspended platforms for equipment are indicated on drawings or specified in specifications design and construct supporting structures of strength to safely withstand stresses to which they may be subject and to distribute properly the load and impact over building areas. Conform to applicable technical societies' standards, also to codes and regulations of agencies having jurisdiction. Contractor shall provide sufficient supports as required. These supports are for foundations, supporting stands, platforms and they shall be connected to the building structural members. All equipment shall be bolted to supports, foundations, stands and platforms. Design of the supports, foundations, supporting stands and platforms must be approved by a California State Licensed Structural Engineer.

1.14 PIPE SLEEVES

- A. Sleeves shall be schedule 40 galvanized steel pipe.
- B. Pipe motion due to expansion and contraction will occur, make sleeves of sufficient diameter to permit free movement of pipe. Where pipes are insulated, make sleeves of sufficient diameter to pass pipe insulation. Check floor and wall construction and finishes to determine proper length of sleeves for various locations. Terminate sleeves flush with walls, partitions and ceiling. Extend sleeves 1/4" above finish floor, except in equipment rooms and other areas where water may accumulate on floor, extend to 1-1/2".
- C. Set sleeves in ample time to permit pouring of concrete or to allow progression of other work as scheduled. Fasten sleeves securely so that they will not become displaced when concrete is poured or when other construction around them. For sleeves in fire walls, pack space between sleeve and pipe with approved non-combustible material and as otherwise required by local code; for floors where water is to be kept out, fill with graphite packing and caulking compound.
- D. Sleeves in underground walls shall be 1-1/2" larger than outside diameter of pipe. The space between sleeve and pipe shall be sealed with 1" long wool and 1/2" water tight flex caulking on both sides of the wall. The seal shall be guaranteed watertight.

1.15 ESCUTCHEONS

- A. Provide 20 gauge escutcheons at all pipe penetrations in walls, ceilings and floors. Escutcheons shall be one piece or hinged two piece type with positive latch or setscrew, and shall be polished chrome plated in finished rooms, and polished brass in other areas. Escutcheons shall have tempered springs or other means to insure positive attachment to pipe. The escutcheon opening shall be of sufficient diameter to fit around the insulation of insulated pipes, and the outside diameter of the escutcheon shall be of sufficient size to conceal the pipe sleeves.

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1.16 EXPANSION AND FLEXIBILITY

- A. Install all work with regard for expansion and contraction to prevent damage to the piping, equipment, fixtures and the building and its contents. Provide piping offsets, expansion loops, approved type expansion joints, anchors or other means to control pipe movement and to minimize pipe forces.

1.17 ACCESS PANELS/DOORS

- A. Provide access panels/doors. Refer to other Division 22 Sections for further reference. Provide access panels/doors with have same fire rating as ceiling, wall in which they are installed, and shall be of sufficient size to provide the required accessibility.
- B. Provide access panels/doors where necessary to provide access to concealed water hammer arrestors, trap primers, cleanouts, shut off valves, control valves etc.
- C. Access doors:
 - 1. Material and Manufacturer: Stainless Steel Series is 16 gage #304 stainless steel door and frame. Provide cylinder key lock. Equal to MIFAB UA-SS. All MIFAB cylinder locks are keyed alike.
 - 2. Sizes shall be 14" X 14" at easily accessible valves, water hammer arrestors, trap primers, cleanouts etc; 18" X 18" where partial body access is required; 24" X 24" where entire body access is necessary.
 - 3. Confer with other contractors with respect to access panel locations and shall wherever practicable group mechanical and electrical equipment in such a way as to be accessible from a single panel and reduce number of doors required.

1.18 TRENCHING, EXCAVATING AND BACKFILLING

- A. Perform all trenching, excavation and backfilling necessary for the installation of underground piping sewers, natural gas, water piping, receivers, and other piping as required.
- B. Obtain the services of an "Underground Locator Service". This Underground Locator Service shall identify all utilities or structures that may be in the path of the underground piping.
- C. Concrete and asphalt shall be removed by first providing saw cut lines. These new saw cut lines shall be at existing joints. For concrete cut and removal, a whole section of concrete from joint line to joint line shall be cut and removed.
- D. Dig trenches to required grade and depth with only sufficient earth material removed to provide working space. Trenches dug below the required depth shall be refilled to proper depth with sand.
- E. Restore to original condition all paved surfaces, including concrete, asphalt, landscaping and any other work which was cut or disturbed through the performance of work under this contract. New concrete and asphalt shall match the existing thickness, density, quality, material characteristics and surface appearance.
- F. All testing and inspections shall be complete, and approvals obtained, before backfilling is performed.

- G. Backfill material around pipe shall consist of sand. Provide a minimum of 4 inches of sand all round piping systems. The remainder of the backfill materials shall be free of rocks, debris, and other foreign materials and shall consist of earthy sand.
- H. Provide tracer wire around site non metallic water piping systems. Provide tracer wire around site non metallic natural gas piping systems. Tracer wire shall be 14 gauge copper wire with plastic covering. Tracer wire shall extend 6 inches above grade at the ends of the piping systems. Provide warning tape a minimum of 18" above pipe.
- I. Water puddle and tamp backfill material in layers of approximately 6" up to finish grade, and as otherwise required so that no settling will occur.
- J. All excess excavated materials shall be disposed of.

1.19 CORROSION PROTECTION

- A. All metallic piping underground shall wrap with 2 layers of 10-mil plastic tape.
- B. No pressurized water lines or natural gas lines will be permitted under building the concrete slab.
- C. All natural gas and water valves, water pressure regulators and other devices shall installed in pre-cast concrete yard boxes with galvanized steel lids. All natural gas and water valves, water pressure regulators and other devices will not be installed in any soil.
- D. Any piping passing through concrete floors, walls or roofs shall be sleeved and wrapped 3 times with plastic foam wrap. Provide epoxy joint sealer, non-shrink, waterproof caulking around all piping risers coming up through concrete floors & sidewalks. If the floors, walls or roofs are existing then core these areas. Provide foam sealant and epoxy joint sealer (non-shrink) waterproof caulking around the space between the pipe and the floors, walls or roofs.
- E. Provide one piece natural gas transition riser from PE pipe to steel pipe. The schedule 80 steel section of the riser shall be epoxy coated. The transition riser shall meet NFPA-58 and ASTM D2513.

1.20 FIRE STOPPING

- A. Provide fire stopping at all rated floors, walls or roofs. Use UL listed materials and methods for sealing these areas.

1.21 IDENTIFICATION OF EQUIPMENT

- A. Each item of equipment shall be permanently labeled with a plastic nameplate of sufficient size to clearly indicate the identification designation appearing on the construction drawings. Letters shall be a minimum of 2 inches high.

1.22 GENERAL TESTING REQUIREMENTS FOR EQUIPMENT AND FIXTURES

- A. The following requirements are supplementary to tests specified for individual equipment, fixtures or systems in other Division 22 sections:
 - 1. Furnish labor, materials, instruments, electric power, etc., and bear all costs in connection with these tests.

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2. Give a minimum of 72 working hour notification to the School District Representative when tests will be conducted. Coordinate test with other trades.
 3. After the work has been completed, subject all systems to acceptance tests under normal operating conditions for periods of 5 working days to show compliance with Contract requirements. Submit to the School District Representative a written certificate that all tests have been performed in accordance with the specification requirements.
 4. All motors shall run at their required speed without showing undue vibration, objectionable noise, or sparking for a period of 5 working days.
 5. The drainage system shall be tested in accordance with the rules and regulations of the authoritative agencies.
 6. Submit to the School District Representative a written certificate that all tests have been performed in accordance with the specification requirements.
- B. Adjustments, repairs, and re-tests:
1. Make adjustments, repairs and alterations, as required to meet specified test results.
 2. Correct defects disclosed by tests or inspections, and replace defective parts when directed.
 3. In replacing defective parts, use only new materials, and in the case of pipe, replace with same length as defective piece.
 4. Repeat tests after defects have been corrected and parts replaced, as directed and until pronounced satisfactory.
 5. Bear the cost of repairs, and restoration of the work by other Contractors that have been damaged by the tests.

1.23 RECORD DRAWINGS

- A. Maintain at the site, a set of record drawings, upon which shall be clearly indicated (by shading, coloring, or some other acceptable method) the day by day extent of the work installed. Indicate all changes to the original design at the end of each day.
- B. At the completion of the construction phase, furnish to the School District Representative all necessary drawings showing work which was not installed as shown in the contract drawings. A minimum of one set of originals and three copied sets shall be furnished. Indicate all pertinent information, i.e., valve locations, pipe routing (dimensionally located), etc. All underground piping shall be located on the record drawings by two or more dimensions. All elevations (inverts) shall be shown with the point of elevation change clearly located. All valves shall be numbered and lettered to correspond with the numbers and letters on the site.

1.24 EMERGENCY REPAIRS

- A. The Owner reserves the right to make emergency repairs as required to keep systems in operation without relieving the Contractor of his responsibilities during the post/partial beneficial occupancy.

1.25 OPERATION BY OWNER

- A. The School District may require operation of parts or all of the respective installations prior to final acceptance. The Owner shall pay for cost of utilities for such operation. Operation of the installation shall not be construed as acceptance of the work.

1.26 INSTRUCTION MANUAL

- A. Prior to completion of installation and final inspection of work, furnish to the School District Representative a minimum of three copies of complete instruction manual, bound in booklet form and indexed for each respective trade.
- B. Manual shall contain the following items:
 - 1. List of all equipment with manufacturer's name, model number and local representative, service facilities, and normal channel of supply for each item.
 - 2. Manufacturer's literature describing each item of equipment or fixtures with detailed parts list.
 - 3. Detailed step-by-step instructions for starting and shutdown of each system.
 - 4. Detailed maintenance instructions for each system and piece of equipment or fixtures.
 - 5. Copy of each automatic control diagram with respective sequence of operations.
 - 6. Individual equipment or fixtures guarantees.
 - 7. Certificates of inspections.
 - 8. Copies of as-built construction and related shop-drawings.
 - 9. All written material contained in manual shall be typewritten.

1.27 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to acceptance of work and during time designated by the School District Representative provide necessary qualified personnel to operate each system and fully instruct School District Facility Representatives in complete operations, adjustment, and maintenance of each respective installation.

1.28 GUARANTEES AND WARRANTIES

- A. All work shall be guaranteed to be free from defects in material and workmanship for a period of one year from the date of final acceptance of the work, or a longer period if stipulated under specific headings. Replace at no additional cost any material, fixtures or equipment developing defects and also pay for any damage caused by such defects, or the correction of defects.
- B. Use warrantee terms for specific items of equipment, relative to the work guarantee requirements of this specification.

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PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3- EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 22 07 00

PLUMBING INSULATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide labor, equipment and materials, and perform all operations necessary for the installation of insulation as indicated. This section includes thermal insulation for piping and equipment.
- B. Provide complete Insulation Submittals and Shop drawings. Refer to Plumbing General Provision Section 22 01 00 Paragraph 1.4 Submittals - Shop Drawings/Product Data/Material Certifications.

1.02 RELATED SECTIONS

- A. Section 22 01 00 Plumbing General Provision
- B. Section 22 20 00 Plumbing Systems, Fixtures and Equipment

1.03 FIRE HAZARD CLASSIFICATION

- A. Insulation shall have a composite (insulation, jacket or facing, and adhesive to secure jacket or facing) fire hazard rating as tested by ASTM E-84, NFPA 255, or UL 723 not to exceed 25 flame spread and 50 smoke developed. Materials labeled accordingly.
- B. Insulation shall conform to current California Plumbing and Mechanical Code.

1.04 QUALITY ASSURANCE

- A. Furnish insulation systems to the project site bearing the manufacturer's label.
- B. Appearance shall be of equal importance with its mechanical correctness and efficiency.

1.05 PROTECTION

- A. Protect insulation against dirt, water, chemical, or mechanical damage before, during and after installation. Any such insulation or covering damaged prior to final acceptance of the work shall be satisfactorily repaired or replaced.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

1.07 SUBMITTALS

- A. Comply with specification Section 22 01 00 General Provision for Plumbing.
- B. Required Submittals
 - 1. Piping insulation, jackets and accessories.
 - 2. Equipment insulation and covering.

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3. For each product being submitted, provide product description, list of materials, thickness, location of use and manufacturer's installation instructions.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Acceptable manufacturers for insulation are Johns Manville Corporation, Owens-Corning and Knauf Insulation.
- B. Acceptable manufacturers in addition to insulation manufacturers for adhesives, sealants and coatings are Foster Construction Products Inc.
- C. Duct tape is not an approved sealer tape and shall not be used on this project.

2.02 PIPING SYSTEM INSULATION

- A. Insulation Type
- B. Glass Fiber: Johns Manville Micro-Lok meeting ASTM C547 or equal; rigid molded, noncombustible, Class 1 not to exceed 25 flame spread and 50 smoke developed.
 1. 'K' ('KSI') Value: 0.23 at 75 degrees F (0.033 at 24 degrees C).
 2. Maximum Service Temperature: 850 degrees F (454 degrees C).
 3. Vapor Retarder Jacket: AP-T PLUS White kraft paper reinforced with glass fiber yarn and bonded to aluminum foil, secure with self sealing longitudinal laps and butt strips or AP Jacket with outward clinch expanding staples or vapor barrier mastic as needed. All insulation and jacket material shall be plenum rated.
 4. Provide 18 gauge galvanized metal insulation shields at pipe hangers. Insulation shields shall provide an expanded surface area to carrier the weight of the piping without distorting or damage to insulation.
- C. Elastomeric Foam: K-Flex Insul-Tube or equal; meeting ASTM C534, flexible, cellular elastomeric, molded or sheet, Grade 1 not to exceed 25 flame spread and 50 smoke developed:
 1. 'K' ('KSI') Value: 0.28 at 75 degrees F (0.04 at 24 degrees C).
 2. Maximum Service Temperature of 220 degrees F (104 degrees C).
 3. Maximum Flame Spread: 25.
 4. Maximum Smoke Developed: 50.
 5. Connection: Waterproof vapor retarder adhesive, as needed; K-Flex 373 Contact Adhesive.
 6. UV-Protection: Outdoor protective coating; K-Flex 374 Protective Coating.
 7. Provide 18 gauge galvanized metal insulation shields at pipe hangers. Insulation shields shall provide an expanded surface area to carrier the weight of the piping without distorting or damage to insulation.

- D. Field Applied Jackets
 - 1. Aluminum Jacket: 0.016 inch (0.045 mm) thick sheet, (smooth / embossed) finish, with longitudinal slip joints and 2 inch (50 mm) laps, die shaped fitting covers with factory attached protective liner.

PART 3 - EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Verify that piping has been pressure tested for leakage before applying insulation materials.
- B. Verify that all surfaces are clean, dry and free of foreign material. Apply insulation on clean, dry surfaces free of any foreign matter and only after tests and approvals required by the specifications have been completed.

3.02 GENERAL INSTALLATION

- A. Install materials in accordance with manufacturer's recommendations, building codes and industry standards.
- B. Continue insulation vapor barrier through penetrations except where prohibited by code.
- C. Insulation shall be installed by workmen regularly engaged in this kind of work in accordance with the manufacturer's recommendations.
- D. All exposed raw edges shall be finished with finishing cement.
- E. If staples are used, all must be coated with adhesive to maintain vapor barrier integrity. Thickness per ASHRAE Standards Table.

3.03 PIPING SYSTEM INSULATION INSTALLATION AND SCHEDULE

- A. Pipe insulation shall be continuous through walls and floor openings except where walls and floors are required to be fire stopped or required to have a fire resistance rating. Where this occurs, the open space remaining between the sleeve and pipe shall be filled with fire stop insulation.
- B. Insulation on piping indicated must be applied with a continuous, unbroken vapor seal. Supports, anchors, etc., that are secured directly to cold surfaces must be adequately insulated and vapor sealed to prevent condensation.
- C. Insulated pipes shall be insulated continuously through hangers. Rigid insulation inserts and metal shields are to be provided at all pipe hangers and supports. Pipe insulation shall abut the rigid insulation insert. Apply a wet coat of vapor barrier lap cement on all butt joints and seal the joints with 3" wide vapor barrier tape or band.
- D. Butt all joints firmly together and smoothly, secure all jacket laps and joint strips with lap adhesive.
- E. Locate insulation and cover seams in least visible locations.
- F. Neatly finish insulation at supports, protrusions, and interruptions.

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- G. Provide insulated pipes conveying fluids below ambient temperature with vapor retardant jackets with self sealing laps. Insulate complete system.
- H. For insulated pipes conveying fluids above ambient temperature, secure jackets with self sealing lap or outward clinched, expanded staples. Bevel and seal ends of insulation at equipment, flanges, and unions.
- I. Provide shield between isolation inserts and hanger supports. Shields shall be minimum of 20 gauge galvanized metal. Fabricate of Johns Manville Thermo-12 or other heavy density insulating material suitable for temperature. Insulation inserts shall not be less than the following lengths;

3" to 6" pipe size	1 1/2" to 2 1/2" pipe size	10" long
8" to 10" pipe size	12" long	
12" and over	16" long	
	22" long	
- J. For pipe exposed in equipment rooms or unfinished spaces provide field applied aluminum jacket.
- K. For exterior piping applications, provide field applied protection jacket or coating. Insulated pipe, fittings, joints, and valves shall be covered with field applied aluminum jacket. Jacket seams shall located on bottom side of horizontal piping.
- L. For return air plenum areas provide non-combustible jacket.
- M. Fittings and valves shall be covered with premolded one-piece insulated covers.
- N. Piping Insulation Schedule, shall comply with 2019 Building Energy Efficiency Standards Table 120.3-A or below, whichever is more stringent:
 - 1. Fiber Glass Insulation
 - a. Domestic Hot Water (supply and return piping):

pipe: up to 2"	1 inch thick
pipe: 2 1/2" to 4"	1 1/2 inch thick
 - b. Condensate piping system

pipe: up to 2"	3/4 inch thick
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- O. All fixtures that are accessible shall have an OFF-set grid drain permitting the trap to be installed flush with the wall. In addition provide PROWRAP insulation kit for exposed hot water pipe, tailpiece, and trap as manufactured by MCGUIRE, and secured per manufacturers recommendations. ADA fixtures only.

END OF SECTION

SECTION 22 20 00

PLUMBING SYSTEMS

PART 1 – GENERAL

1.01 SUMMARY

- A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing and piping and including the demolition and removal of certain existing fixtures, equipment, piping and appurtenances all as required and as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the School District.
- B. Provide fixtures and equipment which have been listed on drawings fixture schedule.
- C. This section describes interior and exterior plumbing systems.
- D. Provide Plumbing Submittals and Shop drawings.
- E. A complete system of sanitary sewer piping and venting.
- F. Roof drains, overflow drains and rainwater piping systems.
- G. Complete domestic hot and cold water piping distribution system, including provisions for all plumbing fixtures and equipment. Provide connections to fixtures and equipment. Provide disinfection.
- H. Condensate system for HVAC equipment.
- I. Pipe hangers and other necessary support items.
- J. Excavating and backfilling.
- K. All Testing required and provide certificates.
- L. Record Drawings.

1.02 RELATED SECTIONS

- A. Section 22 01 00 Plumbing General Provisions
- B. Section 22 07 00 Plumbing Insulation

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1.03 SUBMITTALS

- A. Comply with specification Section 22 01 00 Plumbing General Provisions.
- B. Required Submittals
 - 1. Plumbing fixtures and components.
 - 2. Plumbing equipment and accessories.
 - 3. Plumbing materials including piping, valves, and fittings.

1.04 REGULATIONS

- A. All work covered by this Section shall conform to the latest requirements of the following regulations:
 - 1. National Fire Protection Association.
 - 2. State Division of Industrial Safety.
 - 3. California Code of Regulations (CCR).
 - 4. California Plumbing Code (CPC), California Code of Regulations, Title 24, Part 5.
 - 5. California Fire Code, California Code of Regulations, Title 24, Part 9.
 - 6. County Health Department.
 - 7. Any other legally constituted bodies having jurisdiction thereof.
 - 8. California Building Code (CBC), Title 24, Part 2:
 - 9. Accessible plumbing fixtures shall comply with all the requirements in 2019 CBC Division 6.
 - 10. Heights and locations of all accessible fixtures shall be mounted according to 2019 CBC Sections 11B-602 through 11B-612 and table 11B-604.9 suggested dimensions for children's use.
 - 11. Fixture controls shall comply with 2019 CBC Sections 11B-601.3 for drinking fountains, 11B-604.6 for water closets, 11B-604.9.5 for children's water closets, 11B-605.4 for urinals, 11B-606.4 for lavatories and sinks, 11B-607.5.
- B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the School District representative.

1.05 GENERAL

- A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories, which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary

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pipng, fittings, valves, traps, and other devices, which may be required to complete the installation.

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- B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown.
- C. All permits; inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.
- D. See Drawings for Points of Connection.
- E. Certain site utilities are to be connected to and extended. Before laying of any pipe or digging of any trenches, Contractor shall determine by actual excavation and measurement exact location and depth of lines to which he is to connect. In event depth of lines is not sufficient to permit connection in manner indicated, obtain direction from the Owner's representative before proceeding with this work.
- F. Before bidding on this work, make a careful examination of the premises to get thoroughly familiarized with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.
- G. Protect all work, equipment and materials at all times. Repair all damage caused either directly or indirectly by Contractor's workers. Close all pipe openings with caps or plugs during installation. Protect all equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.
- H. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the School District Representative that his work has been accepted.
- I. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.
- J. Coordinate work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. In advance of the work, furnish instructions to the General Contractor for the requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.
- K. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to put identification numbers on fixtures and equipment schedules.
- L. Manufacturer's submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the

work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.

- M. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.

A list of names is not a valid submittal. To be valid, all submittals must:

1. Be delivered to the School District Representative within thirty-five (35) days of award of the contract. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
 2. Include all pertinent construction, installation, performance and technical data.
 3. Have all copies marked to indicate clearly the individual items being submitted.
 4. Have each item cross-referenced to the corresponding specified item and be marked to show how differences will be accommodated.
 5. Contain calculations and other detailed data justifying how the item was selected for proposal. Data must be completed enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.
 6. Include, for every item, which differs in size, configuration, connections, service, accessibility, or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.
- N. Contractor shall not allow or cause any of his work to be covered up before it has been duly inspected, tested and approved by the School District Representative or authorized inspectors having legal jurisdiction over his work. Should he fail to observe the above, he shall uncover the work and, after it has been inspected, tested and approved, recover it at his own expense.

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- O. Requests for substitutions shall be in accordance with the requirements of Division I. Provide and perform tests required by Engineer for purpose of judging acceptability of proposed substitutions. Provide sufficient information to allow the Engineer to analyze any proposed alternate; the substitution will not be accepted and re-submittal will not be allowed if adequate information is not provided. The Contractor shall make all changes to the work of this trade and the work of all other trades resulting from a substitution at no additional cost to the District. The Representative shall be the sole judge as to the quality and suitability of proposed School District alternate equipment, fixtures, and materials; decisions of the School District Representative shall be final and conclusive.
- P. Provide record drawings in accordance with the requirements of Division 1.
- Q. Keep up-to-date a complete "as-built" record set of prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. On completion of the work the as-built drawings shall be delivered to the School District Representative. Upon approval the contractor shall make a digital scanned copy of the as built drawings. The scanned file name shall match the sheet number of the drawings.
- R. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the District.
- S. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.
- T. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship and shall not be less than one (1) year. See specific equipment specifications for extended warranty requirements.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All materials and equipment as indicated on the drawing, as specified, and required in the work shall be new and free from defects and imperfections.
- B. See the fixture and equipment schedules and notes on the drawings for additional information including manufacturers, model numbers, accessories, capacities, electrical data, weights, and installation requirements.

2.02 PIPE AND FITTINGS

- A. Soil and Waste System
 - 1. Piping below and above grade within the building and outside within five feet (5') of the foundation shall be Solid Wall Schedule 40 Polyvinyl chloride (PVC) Gravity Sewer Pipe and Fittings. Schedule 40 Solid Wall Polyvinyl chloride (PVC) DWV Gravity Sewer Pipe and Fittings. Solid wall PVC pipe and fittings shall be made by

virgin PVC compounds meeting the ASTM D-2665. PVC shall comply with ASTM D-1785. For glue joints, provide Weld-On #2721 medium bodied blue glue. Provide protection at penetrations of walls, floors, ceilings and fire resistance rated assemblies in accordance with ASTM E814. The "F" rating must be a minimum of the hourly rating of the fire resistance rated assembly that the plastic pipe penetrates.

B. Water System

1. Piping within the building and above grade shall be Type "L" ASTM B88, hard drawn copper tubing with wrought copper sweat fittings ANSI B16.22.
2. Water piping underground shall be Type "K" ASTM B88, hard drawn copper with wrought copper sweat fittings ANSI B16.22.
3. Water piping below the building floor shall be Type "K" soft annealed copper tubing with no fittings.

C. Indirect Waste Piping

1. Shall be the same as Soil and Waste Piping.

Condensate Drain System

2. Piping: (Air Conditioning units) shall be Type "M" copper as specified for water piping.
- D. Exposed drain piping at plumbing fixtures shall be chrome plated yellow brass except exposed pipes in shop or utility areas.
- E. Unions or flanges shall be furnished and installed at each threaded connection to all equipment or valves. The unions or flanges shall be located so that the piping can be easily disconnected for removal of the equipment, tank, or valve, and shall be of the type specified in the following schedule.
1. Unions:
 - a. Black Steel Pipe: 250 pound screwed black malleable iron, ground joint, brass to iron seat.
 - b. Galvanized Steel Pipe: 250 pound screwed galvanized malleable iron, ground joint brass to iron seat.
 - c. Copper or Brass Tubing: 150 pound cast bronze or copper, ground joint, nonferrous seat with ends, by NIBCO or Mueller Industries.
 2. Flanges shall be raised face 150 pound class forged steel, weld, neck or slip-on type conforming to ANSI B16.5 and ASTM A181. For copper piping systems, provide flanges conforming to ASME-ANSI B16.24. The faces of the flanges being connected to be alike in all cases. Locate flanges so that the piping can be easily disconnected for removal of the equipment or valve. Gasket material shall be of material suiting the service of the opening system in which installed and which conforms to its respective ANSI Standard (ANSI-AWWA C111/A21.11, ASME-ANSI B16.21). Provide materials that will not be detrimentally affected by the chemical and thermal conditions of the fluid being carried.

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- M. Underground cast iron, ductile iron, copper, steel or other metallic piping located both inside and outside of building shall be encased within a minimum of 10 mil polyethylene plastic sleeve sealed water tight with polyvinyl chloride tape. Sleeve shall terminate 3" above grade or floor slab.
- N. Underground non-metallic piping shall have 16 gauge copper "Tracer Wire" continuous for entire length.

2.03 VALVES

- A. Piping systems shall be supplied with valves arranged so as to give complete and regulating control of piping systems throughout the building, and locates so all parts are easily accessible and maintained.
- B. Valve Design: Provide full port red brass ball valves. Gate valves are not allowed.
 - 1. Sizes: Same size as upstream pipe, unless otherwise indicated.
- C. Approved Manufacturers:
 - 1. Hammond Valve
 - 2. Watts
 - 3. NIBCO
 - 4. Apollo Valves

Provide Class 150 valves meeting the valve specifications where Class 125 valves are specified but are not available.
- D. Ball Valves, 2 Inches and Smaller: Hammond 8501, MSS SP-110, U.S. Safe drinking water act (SDWA) Rated for 150 psi saturated steam pressure, 600 psi WOG pressure; two-piece construction; with bronze body and single reduce bore or better, chrome plated solid brass ball, "Teflon" seats and seals, separate adjustable packing gland and nut, blowout-proof stem and vinyl covered steel handle.
- E. Swing Check Valves, (Hammond IB 944), MSS SP-80; Class 200, cast-bronze body and cap conforming to ASTM B61; with horizontal swing, Y-pattern, and bronze disc. Provide valves capable of being refitted while the valve remains in the line.

2.04 HOSE BIBBS

- A. Hose Bibbs shall be Acorn, Zurn or approved equal, as specified on drawings.

2.05 TRAPS, STRAINERS AND TAILPIECES

- A. Every sanitary fixture, unless otherwise specified, shall be provided with a seventeen (17) gauge tailpiece chromium tailpiece, a Los Angeles pattern chrome plated cast-brass trap, and wall flanges. Provide chromium plated brass casing between the trap and wall flanges with each fixture. All sanitary waste system floor drains (3 inch minimum) and floor sinks shall have cast iron "P" traps.

2.06 CLEANOUTS

- A. J.R. Smith, Zurn or Mifab cast-iron ferrule and countersunk brass clean-out plug with round cast iron access frame and heavy duty secured top cover.
- B. Wall Cleanouts: Zurn No. Z-1468 for steel pipe and Zurn No. Z-1446 for cast iron pipe.
- C. Floor Cleanouts: Zurn No. Z-1400, watertight ABS bronze plug and polished nickel bronze top.
- D. Cleanouts to Grade: Zurn Heavy Duty Clean-out Housing Z-1474 with bronze plug set flush with surface for concrete areas. Asphalt or non-surfaced areas shall be installed with ring of concrete poured around the bottom flange six inches (6") below surface. Use cast iron soil pipe on cleanout risers. For cleanouts in non-traffic areas, terminate cleanout plug in concrete yard box.

2.07 ACCESS PANELS

- A. Wall access panels shall be minimum 14" x 14" for concealed valves and other equipment unless otherwise specified or indicated. Ceiling access panels shall be 18" x 18" minimum.
- B. Wall Panels: Elmdor, DW 14" X 14" – AKL, 14-gage Stainless Steel, Allen Key Latch, for all tile walls and dry wall walls in toilet rooms.
- C. Ceiling Panels Elmdor, DW 18" X 18" –SS-AKL, prime coated steel, type as required for plaster, or dry wall ceilings. Allen Key Latch.
- D. Fire Rated Walls: Elmdor, FR 14" X 14" –SS-CL, for all Fire rated tile walls and dry walls in toilet rooms provide stainless steel panels with cylinder Lock.

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2.08 ESCUTCHEONS

- A. Shall be chrome plated cast brass with set-screw locking device or slip on.

2.09 WATER HAMMER ARRESTORS

- A. Provide where indicated on drawings of type indicated on equipment schedule and shall be sized per the manufacturer's recommendations. Install behind access panel.

2.10 DIELECTRIC UNION ISOLATORS

- A. Where incompatible materials come in contact, isolate from each other with material best suited for the characteristics of materials to be isolated. Dielectric union isolator for connection piping or non-compatible materials shall be of standard commercial design with threaded connections.

2.11 PIPE SUPPORTS

- A. The Contractor shall furnish and install all miscellaneous iron work including angles, channels, etc., required to appropriately support the various piping systems. Hanger spacing and location shall conform to California Plumbing Code requirements.
- B. All horizontal runs of piping within the building, except for copper water supply stub-outs at fixtures and copper supply headers within walls, to be supported from the structural framing with steel rods and split ring hangers: Cooper B-Line, Grinnell Company, Tolco, or approved equal. Copper stub-outs and copper headers within walls to be supported from the wall framing with Holdrite pipe hangers and supports as specified at item 9, below. Steel rods shall be secured to overhead framing with side beam connectors. Where necessary, install angle iron between framing to accommodate hanger rods. Where several pipes are running together, Unistrut, Copper B-Line, or Powerstrut channels with clamps may be used in lieu of individual pipe hangers, and supported from structure as herein specified. Submit test data for type of hanger supports to be provided. For support conditions other than specified herein, the Contractor shall submit method of support for approval prior to any installation.
- C. Makeshift, field devised methods of plumbing pipe support, such as with the use of scrap framing materials, are not allowed. Support and positioning of piping shall be by means of engineered methods that comply with IAPMO PS 42-96. These shall be Hubbard Enterprises/HOLDRITE support systems or Owner-approved equivalent.
- D. Provide factory fabricated horizontal hangers and supports complying with one of the following MSS types listed to suit horizontal piping systems, in accordance with MSS SP-69, IAPMO PS 42, and manufacturer's published information. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper-plated hangers and supports for copper-piping systems.
 - 1. Adjustable Steel Clevis Hangers: (MSS Type 1) B-Line B 3100
 - 2. Adjustable Swivel Pipe Rings: (MSS Type 5) B-Line B 3690
 - 3. Split Ring: (MSS Type 11)
 - 4. Pipe Alignment and Support Brackets: (Per IAPMO PS 42) HOLDRITE products (see section.9.)

- E. Provide factory fabricated vertical-piping clamps complying with the following types listed, to suit vertical piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of vertical piping clamps to exactly fit pipe size of bare pipe. Provide copper-plated clamps for copper-piping systems.
1. Two-Bolt Riser Clamps: (MSS Type 8) B-Line B3373
 2. For vertical mid-span supports of piping 4" and under, use Hubbard Enterprises/HOLDRITE Stout Brackets™ with Hubbard Enterprises/HOLDRITE Stout Clamps or two-hole pipe clamps (MSS Type 26).
- F. Provide factory fabricated hanger-rod attachments B-Line, Tolco or approved equal, selected by Installer to suit horizontal-piping hangers and building attachments, in accordance with ANSI-MSS SP-58 and manufacturer's published product information. Select size of hanger-rod attachment to suit hanger rods. Provide copper-plated hanger-rod attachments for copper-piping systems.
1. Side beam eye socket, Tolco Fig. #57 for rod sizes 3/8" dia. and Tolco Fig. #25-30-251 for rod sizes 1/2" dia.
- G. Provide factory fabricated building attachments, selected by Installer to suit building structural framing conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods. Provide copper-plated building attachments for copper-piping systems.
1. For existing concrete construction, provide expansion shields.
- H. Hanger Rods and Spacing shall conform to the following table:
- | <u>Pipe Sizes</u> | <u>SpacingRods</u> | |
|----------------------|--------------------|----------|
| 2 Inch and Smaller | 6 Feet | 3/8 Inch |
| 2-1/2 Inch to 3 Inch | 8 Feet | 1/2 Inch |
| 4 Inch and larger | 8 Feet | 5/8 Inch |
- I. Hangers and Supports shall be adequate to maintain alignment and prevent sagging and shall be placed within 18 inches of joint. Support shall be provided at each horizontal branch connection.
- J. When securing copper water supply piping directly to the DWV piping or to the wall framing (horizontal water headers and fixture stub-outs), the following copper-plated components of the "HOLDRITE" system are to be used as a support system:
1. For positioning supply/flush valve for wall-hung water closet, use model 114C (attaches to carrier) and 114C-EXT (extension for above, e.g., for fixtures to be used by handicapped).
 2. For attachment to wall framing, use models 101-26, 102-26.
- K. Provide piping support per anchorage notes on drawing P0.1 and details 10, 11, 12 and 13 on drawing P5.11.
- L. Miscellaneous Supports, Wall Brackets, Etc.: Provide where required in accordance with the best standard practices of the trade. Submit shop drawings for all fabricated supports where engineered supports are not available.

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- M. 2.17.13 Isolators: All water piping shall be installed with a manufactured type isolator. Isolators shall be B-Line vibra clamp and cushion, Elmdor/ Stoneman, "Trisolator", or approved equal. Piping shall be installed and supported in a manner to provide for expansion without strains. Guides shall be properly installed to ensure this requirement.
- N. Shields: Provide 20 gauge galvanized sheet metal shields at piping hangers for all insulated piping. Size shields for exact fit to mate with pipe insulation.

2.12 FIXTURES

- A. See fixture schedule on drawings.
- B. Accessible plumbing fixtures shall comply with all the requirements in 2019 CBC Division 6. Heights and locations of all accessible fixtures shall be mounted according to 2019 CBC Sections 11B-602 through 11B-612. Fixture controls shall comply with 2019 CBC Sections 11B-601.3 for drinking fountains, 11B-604.6 for water closets, 11B-604.9.5 for children's water closets, 11B-605.4 for urinals, 11B-606.4 for lavatories and sinks, 11B-607.5 for bathtubs, 11B-608.5 for showers, and 11B-611.3 for washing machines and clothes dryers. Accessible sinks shall be 6-1/2" deep maximum. Sinks shall be mounted with the front of the higher of the rim and counter surface 34" maximum above the finish floor or ground. Water supply and drain pipes under lavatories and sinks shall be insulated or otherwise configured to protect against contact. There shall be no sharp or abrasive surfaces under lavatories and sinks. 2019 CBC Section 11B-606.
- C. Fixtures:
 - 1. All floor drains shall be minimum 3" sanitary sewer pipe outlet.
 - 2. Furnish complete with necessary trim, including stops. All trim and fittings shall be chrome-plated brass including handles, supply tailpieces, traps and escutcheons.
 - 3. Connections to fixtures shall be in accordance with code requirements except as exceeded herein or on the drawings and in no case less than the supply stop size.
 - 4. All plumbing fixture faucets submitted for review shall have identification label or certification showing compliance with California TITLE 24, PART 5, ARTICLE I, "Energy Conservation Standards". ARTICLE I, T20-1406; ARTICLE 2, T20-1525 and ARTICLE 4, 1604 and 1606.
 - 5. Minimum waste sizes shall be four inch (4") for water closets and two inch (2") for lavatories.
 - 6. Steel plate supports shall be provided for all wall hung fixtures. Supports shall be 3/8 inch thick x 6 inch wide steel plates recessed and lag screwed to wood studs or welded to steel studs and tapped for fixture bolts. Length and number of plates as required to satisfactorily support the fixtures installed.

PART 3 - EXECUTION

3.01 FIXTURE INSTALLATION

- A. Water piping and drain connections shall not be smaller than the sizes allowed by the plumbing code.
- B. Furnish all fixtures complete with supplies, individual stops, traps, escutcheons, trim and all other accessories to provide a complete fixture. Fixtures shall be set in place and secured to walls. Provide ADA trap and piping wrap at lavatories and sinks per ADA requirements.
- C. All plumbing fixtures shall be bedded and caulked along joint at walls, countertops, and other intersecting surfaces with DAP Kwik-Seal Tub and Tile adhesive caulk. DAP package code number shall be 18001 white caulk.
- D. Caulk around the bases of toilets, urinals and vitreous china sinks.
- E. All faucets to be installed using "Plumber Putty" under the base of the faucet for a watertight seal.
- F. Plumbing fixture trim and exposed supplies and waste shall be brass with polished chrome plated finish. Polished chrome plated piping, fittings, and valves shall not bear tool marks.
- G. Provide backing for each plumbing fixture requiring same, at the time roughing-in is done.
- H. After the fixture installation is complete, cover and protect the rims, front, and all exposed parts until the completion of the construction phase. The plumbing contractor shall be responsible for all damage to fixtures, and shall assume all related costs.

3.02 LOCATIONS AND ACCESSIBILITY

- A. Sleeves for piping through masonry walls or floors shall extend completely through the walls or floors. Sleeves shall finish flush on both sides. Provide risers clamps at all floor penetrations.
- B. Unions shall be installed after each screw-type valve, connections for all equipment, appliances and as required for erection and maintenance. No unions shall be installed in concealed location.
- C. All condensate drains to have clean-outs at each horizontal run. Clean-outs shall be F.I.P. thread brass plugs.
- D. All sanitary sewers, sanitary waste, and condensate lines and shall be graded at a minimum of 1/4" per foot unless other wise noted on the drawings. The sections of the pipe shall be laid and fitted so when completed the sewer will have smooth and uniform invert.

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- E. Install equipment for ease of maintenance and repair. If changes in the indicated locations or arrangements are made by the Contractor, they shall be made without additional charges.
- F. Closing-In of Uninspected Work: Do not allow or cause any of the work to be covered up or enclosed until it has been inspected, tested, and accepted by the School District Representatives. Any work enclosed or covered prior to such inspection and test shall be uncovered and, after it has been inspected, tested, and approved, make all repairs with such materials as may be necessary to restore all work, including that of other trades, to its original and proper condition.
- G. Before laying of any pipe or digging of any trenches, Contractor shall determine by actual excavation and measurement exact locations and depth of existing utility and service lines to which he is going to connect. Should existing conditions prevent for installation of piping as detailed on drawings or to make connection in manner indicated, Contractor shall confer with the School District Representative for Direction.

3.03 EXCAVATION, TRENCHING AND BACKFILL

- A. Do all necessary trench excavation, shoring, backfilling and compaction required for the proper laying of the pipe lines. Remove all surplus earth materials from site.
- B. Backfill shall be clean soil free from rocks and debris. Compact to ninety percent (90%) of surrounding soil. All piping both inside and outside of building shall be installed in a minimum 6" sand bed and covered with 6" of sand prior to backfill. Continue backfill with materials free of rocks and debris, properly moistened and mechanically tapered and compacted to 90% of surrounding soil. Compaction by flooding or jetting is expressly prohibited.
- C. Water, soil and waste piping shall have twenty-four (24") of cover minimum, except all PVC pipe material. All other pipe shall have not less than eighteen inches (18") of cover, unless otherwise noted on the drawings. Offset water piping as required to permit crossover of underground piping systems, and electrical conduit systems.
- D. Bottoms of Trenches: Cut to grade and excavate bell holes to ensure the pipes bearing for their entire length upon the outside periphery of the lower third of the pipe.
- E. Trees: When it is necessary to excavate adjacent to existing trees, the Contractor shall use all possible care to avoid injury to trees and roots. Where a ditching machine is run close to trees having roots smaller than 2" in diameter, the wall of the trench adjacent to the trees shall be hand trimmed making clean cuts through the roots. All cuts through roots 1/2" and larger in diameter shall be painted with "Tree-Seal", or equal. Trenches adjacent to trees should be filled within 24 hours after excavation, but where this is not possible, the side of the trench adjacent to the tree shall be kept shaded with burlap or canvas. Stockpiling of earth or building materials within the drip line of trees is prohibited. Where any roots 2" and larger are encountered, the Contractor shall hand tunnel under root and protect it by burlap wrapping.
- F. Water piping shall not be run in the same trench with sewer or drainage piping unless separated as required by the UPC as follows. The bottom of the water pipe at all points shall be at least twelve (12) inches above the top of the sewer or drain line. The water pipe shall be placed on a solid shelf excavated at one side of the common trench with a minimum clear horizontal distance of at least twelve (12) inches from the sewer or drain line.

- G. No piping shall run in, through or above any electrical equipment rooms or spaces at any time.
- H. Horizontal soil and waste piping shall be installed to a uniform grade of not less than one fourth inch (1/4") per foot, unless otherwise indicated or directed.

3.04 PIPING INSTALLATION

- A. Piping shall be concealed in finished portion of the building except where otherwise indicated or directed at the time the work is done. All piping shall be installed to clear all framing members and beams, even if drawings do not indicate same. Contractor shall constantly check the work of other trades so as to prevent any interference with the installation of this work.
- B. Piping into stem walls and footings shall be double half lap wrapped with 1/8" thick "Armaflex" insulation. The Contractor shall also provide blocked out areas in stem wall and footing as required for the installation of the piping. All piping shall avoid the lower 8" of the footing and the Contractor shall coordinate and provide dropped footings as required for the installation of the underground piping.
- C. Unions shall be installed on one side of all screwed shut-off valves, at both sides of screwed automatic valves and on all by-passes, at all equipment connections and elsewhere as indicated or required for ease of installation and dismantling.
- D. Connections between copper tubing and equipment shall be with Mueller Industries, or approved equal, brass stream-line copper to P.P.S. ground joint unions.

3.05 CORROSION PROTECTION

- A. All underground metallic piping such as cast iron (soil & drain), ductile iron (fire protection), copper (Water) or steel (gas) located both inside and outside of the building shall be encased within a minimum of 10 mil polyethylene plastic sleeve.
- B. All underground metallic valves, unions, fittings, flanges, bolts & appurtenances that are unable to be encased within sleeve as noted above shall be protected as follows.
 - 1. After mastic coating is completed and inspected, wrap entire metallic component with a minimum of 10 mil. Polyethylene wrap overlapped 50% of the circumference and extended beyond ends of component as required for polyethylene to be secured to piping. The overlap seam shall be located to avoid backfill material from entering the encapsulated area. The ends and seam of the of the polyethylene material shall be secured to the piping and sealed with 3M Scotch/Wrap N. 50, 10 mil., 2" wide, printed, pipe wrap sealing tape.
 - 2. The mastic coating shall be inspected and approved prior to the finish application of the polyethylene material, which shall also be inspected.

3.06 SLEEVES

- A. Shall be schedule 40 galvanized steel where pipes pass through concrete foundation walls and 22 gauge galvanized sheet metal in all other walls, floors and partitions.

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1. Isolate pipes through ground floor slabs with double wrap Kraft paper, unless pipe sleeves as specified above as indicated or required by code.
 2. Pack space between pipe and sleeves with ceramic fiber rope so as to be absolutely watertight.
 3. All sleeve penetrations in or through fire rated stud walls, ceilings or floors shall be protected & sealed per U.L. Fire Resistance System No. WL1001 for uninsulated pipe and No. WL5039 for insulated pipe. All sleeve penetrations in or through fire rated concrete/masonry walls, ceilings or floors shall be protected and sealed per U.L. Fire Resistance System No. C-AJ-1116 for un-insulation pipe and No. C-AJ-5002 for insulated pipe. See architectural plans for all locations of rated walls and other fire rated assemblies.
 4. Hanger rods required to pass through fire rated finished ceilings shall be protected as specified here in above and an escutcheon plate provided at face of penetration.
- B. Contraction and Expansion: Install all work in such a manner that its contraction and expansion will not do any damage to the pipes, the connected equipment, or the building. Install offsets, swing joints, expansion joints, seismic joints, anchors, etc., as required to prevent excessive strains in the pipe work. All supports shall be installed to permit the materials to contract and expand freely without putting any strain or stress on any part of the system. Provide anchors as necessary.
- C. Pipe Joints and Connections:
1. Copper Tubing and Brass Pipe with Threadless Fittings:
 - a. Solder joints for copper shall be made with 95/5 lead free solder in accordance with manufacturer's recommendations for the service intended and shall be NSF-ANSI Standard 61 certified approved.
 - b. Use threaded adapters on copper tubing where threaded connections are required.
 2. Welded Joints: All welding to be performed by welders certified as passing ASME Boiler and Pressure Code (Section IX) and shall comply with ASME Std. B31.1.0 and the American Welding Society, Welding Handbook.
- D. All closet bends shall be adequately blocked and secured. Trap arms and similar connections installed below the floor level or under concrete slabs shall be adequately supported and anchored to prevent motion in any direction. All piping installed above grade within buildings shall be secured to structural framing with Unistrut or pipe clamps to provide a rigid installation. Piping utilizing gaskets as a seal shall be given prime consideration to providing adequate stability through proper supports and anchors because of its flexible nature.
- E. Flexible piping of any kind will not be permitted except when indicated on drawings provide Hose Master Inc., flexible pipe appliance connector model UNP, female union, male nipple and plastic cover, AGA approved for kitchen equipment only.
- F. Each pipe penetration of the roof shall be separated from other piping and any roof equipment by a minimum of 18" to insure a proper pipe flashing installation.

- G. Floor, Wall and Ceiling Plates: Where pipes pierce finished surfaces, C.P. brass split flanges with set screw lock shall be provided.
- H. Roof Flashings: Extend pipe a minimum of seven inches (7") above finished roof line, except where a vandal proof hood is required in which case pipe shall extend to a height required to receive the hood and also where specifically required to exceed this dimension by the local authority due to snow conditions.
- I. Installation of Plumbing Fixtures:
 - 1. Install each fixture at the exact height and location shown on the Architectural Drawings.
 - 2. Set fixtures, supplies, trap and trap outlet square with the wall, in line with fixture outlets without any offsets, angles, or bends.
 - 3. Grout joint between the fixtures and the walls or floors with polysulfide or silicone sealant to be smooth, even and watertight.
 - 4. Watertight joints for drainage connections to all fixtures shall be made in accordance with the California Plumbing Code.
- J. Completion of Installation:
 - 1. Cleaning and Flushing: Clean all equipment and materials thoroughly. Leave surface to be painted smooth and clean, ready for painting.
 - 2. Flush each unit of water supply and distribution system thoroughly with clean water at the highest velocities attainable.
 - 3. Clean all piping, valves, traps, fixtures and other devices thoroughly and flush or blow out until free of scale, oil silt, sand, sediment, pipe dope and foreign matter of any kind.

3.07 CUTTING & PATCHING

- A. The cutting and patching of existing construction shall be coordinated in advance of the work.
- B. Where required to remove, cut or core drill existing building walls, partitions, floors, ceilings and roof and outdoor paved and landscaped areas in order to install the work as indicated, the Contractor shall cut and patch existing construction to match adjacent areas in a manner that will not result in visual evidence of any cutting or patching. The materials, finishes and methods of installation shall match the existing adjacent surfaces and shall be in accordance with the requirements of other applicable sections of these specifications.
- C. Unless specified on structural drawings, any alterations or modifications to a structural element by cutting, drilling, boring, bracing, welding, etc., shall have written approval by Structural Engineer of record and DSA prior to start of work.

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3.08 STERILIZATION OF DOMESTIC WATER LINES

- A. Sterilize water lines by filling with a solution containing fifty (50) parts of chlorine per million parts water and holding the solution therein for at least twenty-four (24) hours with a water head of at least five feet (5') above the highest point in the system. Unless otherwise directed, thoroughly flush each line prior to sterilization. Introduction of sterilizing solution or materials into the lines shall be such as to provide thorough and uniform distribution throughout the system.
- B. Operate all valves during the retention period. Following retention period, the heavy chlorinated water shall be flushed from the system with clean water.
- C. Continue flushing until the residual chlorine at the end of 24 hours does not exceed the chlorine residual in the flushing water.
- D. All work and certification of performance must be done by an approved laboratory utilizing qualified applications and personnel.

3.09 TESTING

- A. No piping work shall be concealed or covered until piping has been tested, inspected and approved by the Inspector. All piping for plumbing systems shall be completely installed and tested as required by the California Plumbing Code. Test pressures and times indicated are a minimum only. All tests shall be as required by the governing authority as well.

Schedule of Test Pressures:

<u>System Tested</u>	<u>Gauge</u>	<u>Test</u>	<u>Duration</u>
Water	100 Pounds or 1½ times working pressure whichever is greater.	Water	8 Hours
Waste, Vent &	Minimum 10 Feet of Head	Water	8 Hours

OPERATION INSTRUCTION

- A. Prior to occupancy or prior to the date of final inspection, whichever may occur first, the Contractor shall prepare two (2) sets of typewritten instructions for the operation of all equipment, valves, etc., specified and furnished as a part of the work under this section, and shall assign a competent person, thoroughly familiar with the job, to demonstrate and instruct a representative of the Owner in the operation of the equipment. The time of said demonstration and instructions shall be arranged with the Owner's representative approximately one (1) week in advance. Verbal instructions shall include shut-off location of water. The Contractor shall assemble all operation and maintenance data supplied by the manufacturers of the various pieces of equipment, all keys and special wrenches required to operate and service the equipment (including keys for yard boxes, fixture stops), and all equipment warranties and deliver same to the representative of the Owner on date of said instructions.

3.10 PIPE AND EQUIPMENT IDENTIFICATION

- A. Each operating and service line shut-off valve shall be identified by a 19 ga. brass tag with stamped, engraved type of service identified, complete with a hole and brass chain mounted on valve stem or handle. Tag shall be a minimum of one and one-half inch (1½ ") in diameter. The contractor shall provide valve chart (framed and mounted in Custodial Room) with size, type and location of all shutoff valves. Valves shall be numbered to match corresponding valve tag.
- B. Access Panel Markers: Provide manufacturers standard 1/16 inch thick engraved plastic laminate marker, with abbreviations and numbers corresponding to concealed valve.
- C. All equipment shall be provided with name plate indicating all pertinent information on it.
- D. Manufacturer's (Seton or Brandt) standard permanent, bright colored, continuous printed plastic tape, intended for all interior piping and direct-burial service, piping not less than 6 inches wide x 4 mils thick. Provide multi-ply tape consisting of solid aluminum foil core indicating type of service of buried pipe between two layers of plastic tape. The warning plastic (service identified) tape shall be placed one (1) foot above all buried pipe.

3.11 SCHEDULING OF WORK:

- A. The facilities will be in operation during the entire period of construction. The Contractor shall be responsible for the proper scheduling of his work to insure that the existing mechanical systems to be replaced, modified and extended into existing utilities are kept in operation during the entire period of construction. When interrupted service are unavoidable, the Contractor shall confer with the Owner's authorized representative to determine at what times the connections can be made to minimize the interruptions to the normal operation of the facilities.
- B. Certain piping and equipment are presently insulated and asbestos compounds. The work required for this asbestos removal will be the responsibility of the Owner and shall be in full compliance with all governing authorities. The Owner shall certify that all asbestos removal has been completed prior to contractor's start of work.

3.12 DEMOLITION

- A. General: Provide all work necessary for demolition, dismantling, cutting & alterations as indicated, specified and required for completion of the work. The work shall include but not be limited to the following major items.
 - 1. Protection of existing work to remain.
 - 2. Disconnecting & capping sewers.
 - 3. Removal of items as indicated on drawings.
 - 4. Salvageable items to be retained by Owner.
- B. Project Site Conditions:
 - 1. Drawings may not indicate in detail all demolition to be carried out. Contractor shall carefully examine existing work to determine full extent of demolition required for completed work to conform to drawings and specifications.
 - 2. Existing work to remain that is damaged during and by demolition operations shall be repaired or replaced to satisfaction of the Owner at no cost to the Owner.

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3. Contractor shall be solely responsible for damage resulting from inadequate or improper support demolition procedures including dust containment.
- C. Coordinate:
1. Prior to commencement of work, contact the owner's representative to confirm that all items identified to be removed are clearly marked.
 2. Coordinate demolition with other trades to ensure correct sequence, limits, and methods of proposed demolition. Schedule work to create least possible inconvenience to operation of the facility.
- D. Salvage: The Owner's representative shall determine with the contractor certain items that are to be kept by the Owner & these items shall be taken by the contractor to a place of storage as directed by the Owners. All other demolition items shall be removed from the premises by the contractor.
- E. Protection:
1. Do not demolition until temporary, barricades, warning signs and other forms of protection are installed.
 2. Provide all safeguards, including warning signs and lights, barricades, and the like during demolition.
 3. Noise, Dust and Water Controls: Containment shall be provided as required.
 4. Safety: If at any time safety of exiting construction appears to be endangered, Contractor shall take immediate measures to support such endangered construction; operations and immediately notify the Owners representative.
- F. Removal of Existing Plumbing, Piping, Fixtures, And Services: Contractor shall remove from site existing piping, plumbing g equipment, fixtures and services not indicated for reuse and not necessary for completion of work. Cap services to their portion of work prior to commencement of, or during work of, this section.
- G. Patching: Patch materials, which are to remain when damaged by this work. Finish material and appearance of patch or repair work shall match existing contiguous materials and finishes in all respects
- H. Clean-Up/Disposal: Debris waste, and removed materials, other than items to be salvaged, are Contractor's property for legal disposal off site. Continuously clean up and remove these items and do not allow accumulating in building(s) or on site.

END OF SECTION

23 00 00

HEATING, VENTILATING, AND AIR CONDITIONING

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SECTION 23 01 00

HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS GENERAL PROVISIONS

PART 1- GENERAL

1.01 SUMMARY

- A. Provide items, articles, materials, operations and methods listed, mentioned and scheduled on drawing and specifications, including labor, materials, equipment, and incidentals necessary or required for the completion, testing, inspection, adjusting, re-testing and readjusting to provide the various systems operable and complete in all respects.
- B. Provide fixtures and equipment which have been listed in the Material Standards by School District.

1.02 RELATED SECTIONS

- A. Section 23 20 00 Heating, Ventilating and Air Conditioning Systems
- B. Section 23 07 00 Heating, Ventilating and Air Conditioning Insulation

1.03 DRAWINGS AND SPECIFICATIONS

- A. Examine and become familiar with all project drawings and sections of the specifications, and coordinate the work accordingly. Make reasonable modifications in the layout and installation as needed to prevent conflict with work of other trades and for proper execution of the work, without additional cost.
- B. The drawings indicate approximate locations of equipment, ductwork, piping, etc., however, prior to ordering any equipment or materials, or performing any work, all dimensions, locations, and clearances shall be verified by the Contractor, based on actual field conditions, following the necessary coordination with other trades.
- C. The substitutions of equipment may not be the same as that which was used as a basis for design. The term substitutions only refers to items listed in our specification that are not used as the basis of design on our drawings. Provide all necessary revisions to the installation, or work of all other trades to accommodate the substituted equipment, maintaining comparable clearances and provisions for maintenance shall be provided, with all related costs, by the Contractor. Submit substituted working drawings and submittals that have been coordinated with all other associated trades, showing the proposed installation.
- D. It is the intention of the specifications and drawings to call for finished work, tested and ready for operation.
- E. Where any device or part of equipment is herein referred to in the singular number, such reference shall be deemed to apply to as many such devices as are required to complete the installation or as shown.

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1.04 SUBMITTALS - SHOP DRAWINGS/PRODUCT DATA/MATERIAL CERTIFICATIONS

- A. Submittals shall include six copies of all shop drawings, product data and material certifications for the project. These submittals shall be sent to the School District Representative.
- B. School District Representative will review the shop drawings, product data and material certifications for the project. Do not fabricate pipe, duct or order any equipment without shop drawings and product data being approved. All pipe systems, duct systems, equipment and other accessories require submittal review.
- C. Shop drawings, product data and material certifications shall be complete in every respect so that a thorough review and evaluation can be performed. All required shop drawings, product data and material certifications shall be submitted at one time. Incomplete submittals, those without shop drawings, those that are not prepared properly, or submittals with less than the required number of copies, shall be returned for resubmittal.
- D. It is intended that only a one-time review of all shop drawings and submittals will be performed, and any additional checking, which is required due to improper preparation by the Contractor, will be billed as an extra cost to the Contractor.
- E. All shop drawings, product data and samples submitted by the Contractor shall illustrate details of work, equipment, materials, products, systems, designs or workmanship that the Contractor intends to use in order to comply with the design concept established in the contract documents. The review of these submittals is only for the limited purpose of checking the same for conformity with the design concept of the work as established in the contract documents. The review is not intended to be for the purpose of determining the accuracy of other matters that may be contained in such submittals, including but not limited to such matters as dimensions, quantities and performance of equipment. Contractor shall furnished construction means, methods, techniques, sequences, procedures or safety precautions, the correctness of which as set forth in the contract documents or submittal shall be the sole responsibility of the Contractor.
- F. Only equipment, material and components of those manufacturers indicated in this specification are acceptable. Products that have not been reviewed and accepted by the School District Representative before the bidding period will not be accepted.
- G. To be considered as a acceptable confirm that the alternate manufacturers' equipment or fixture is comparable with regard to such features as noise level, power requirements, metal gauges, vibration attenuation, finish, appearance, certification of recognized testing agencies and standard bureaus, allowable working pressures, physical size and arrangement. The Contractor shall also consider the effect of installation in the available space, factory-applied insulation, electrical devices, controls, access to internal parts, operating efficiencies, and all other features and capacities specified herein. The School District Representative shall be judge of the ability of any equipment, fixture or material to meet the requirements of this specification and the burden of proof shall be the responsibility of the Contractor.
- H. Format: Each type of equipment, fixture or material shall be submitted in a separate section of the submittal package and each such section shall have:

- I. A cover sheet identifying the equipment or fixture by the numbers or letter identical to those listed on the Drawings and/or Specifications, the manufacturer, the model number and size, and the technical data required for each piece of equipment or fixture. Materials shall be identified by system type.
- J. Dimensional drawings (including optional accessories appropriate to this project).
- K. Electrical data tables showing voltage, phase, horsepower (or kW), full load (or rated load) amperes and maximum fuse protection for each piece of equipment.
- L. Capacity data tables (copies of catalog capacity tables) including fan curves for air moving devices.
- M. Each submittal shall specifically reply to every item of equipment, fixture or material specified or scheduled. All information shall be listed on the submittal cover sheet and shall be marked in the submitted manufacturer's literature. All exceptions to the individual specifications shall be listed separately on the submittal cover sheet and shall be noted on submittal "cut sheet".
- N. Shop drawings are required for the heating, ventilating and air conditioning systems. Submit one set of original drawings suitable for reproducing clear copies and provide six copies of drawings. The shop drawings will be reviewed. Contractors shall reproduce copies for their use. Shop drawings, equipment, fixture and material submittals shall be delivered at the same time.

1.05 INVESTIGATION OF CONDITIONS

- A. 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 damage 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 it the independent locating service before start of construction to determine location of existing utilities.
- B. This project is a new building on an existing site with existing utilities and an examination of the site is mandatory.]
- C. Examine the existing conditions bearing on labor, transportation, handling and storage of materials, etc. Visit the site to understand the nature and scope of all work to be performed. The submission of a bid will be taken as evidence that such an examination has been made and all conditions have been considered.

1.06 EXISTING INSTALLATION AND CONFLICTS

- A. Existing active services, water, sewer, electric, other piping systems, when encountered, shall be protected against damage due to construction work. Do not disturb operation of active services that are to remain.

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- B. If existing active services are encountered which require relocation, make request to the School District Representative for determination of procedures. Where existing services are to be abandoned, they shall properly terminate in conformance with requirements of the School District Representative.
- C. If work makes temporary shut-downs of services unavoidable, consult with School District Representative as to dates, procedures and estimated duration of shut-down period in advance of the date work is to be performed.
- D. Work shall be performed to assure that the existing operating services will be shutdown only during the time allowed and required to construct necessary connections. If a system cannot be shutdown, temporary bypass jumpers shall be installed until connections are complete.
- E. Be responsible for all costs incurred by the above shut-downs, including bypass or jumper installations for work performed under Division 23.
- F. If existing active utility services are encountered which require relocation, make request to School District Representative or other proper authorities for determination of procedures. Where existing services are to be abandoned, they shall properly terminated and capped.

1.07 ORGANIZATIONS

- A. Below is a list of organizations that may be identified throughout the specifications by the letters in parenthesis only.
 - 1. American Society of Heating, Refrigerating, Air Conditioning Engineers (ASHRAE)
 - 2. American Society of Mechanical Engineers (ASME)
 - 3. American Society for Testing and Materials (ASTM)
 - 4. Factory Mutual Laboratories (FM)
 - 5. National Electrical Manufacturer's Association (NEMA)
 - 6. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
 - 7. Underwriters' Laboratories, Inc. (UL)
 - 8. American National Standards Institute (ANSI)
 - 9. Air Conditioning and Refrigeration Institute (ARI)

1.08 DEFINITIONS

- A. Furnish: To purchase and supply equipment, materials or components and deliver to the jobsite.
- B. Install: To place, fix in position, secure, anchor, etc., including necessary appurtenances and labor so the equipment or material of the installation will function as specified and intended.

- C. Provide: To furnish and install.
- D. Piping: Includes, in addition to pipe, all fittings, flanges, valves, hangers, and other accessories related to such piping.
- E. Concealed: Means hidden from sight in chases, furred spaces, shafts, hung ceilings, or embedded in construction.
- F. Exposed: Means not installed underground or "concealed" as defined above. Tunnels, trenches, attic spaces and crawl spaces are considered exposed.
- G. Accepted/Acceptable: Items, that in the opinion of the School District Representative, are acceptable alternates for the item specified.

1.09 CODE, PERMITS AND FEES

- A. The drawings and specifications take precedence when they are more stringent than codes, ordinances, standards and statutes. Codes, ordinances, standards and statutes take precedence where they are more stringent than the drawings and specifications.
- B. Secure and pay for permits, tests, Certifications of Inspection, and all other costs incidental to the work.

1.10 GENERAL COORDINATION OF WORK AND WORKING PROCEDURES

- A. All equipment and materials shall be covered or otherwise protected from the weather, theft, etc., both when stored on the site and after installation, until final acceptance by the School District Representative. All open ends of installed piping and ductwork for partially completed systems shall temporarily be plugged and capped.
- B. All materials of construction shall be new and shall bear the manufacturer's labels and trademarks.
- C. The specifications indicate general requirements for the installation of all equipment and materials however, follow the specific instructions and directions furnished by the equipment or fixture manufacturer.
- D. All equipment shall be installed with full consideration of future maintenance. Equipment that is installed such that it cannot be readily serviced shall be removed and installed correctly as directed to facilitate servicing.
- E. Unions, valves, dampers, and other components that may require lubrication or maintenance shall be located to provide sufficient accessibility. When necessary, provide access doors as hereinafter specified at all locations where these items are concealed within walls, chases, or above ceilings which do not have an inherent accessibility feature.
- F. Prior to testing and balancing of air systems, clean the interior of all duct systems and air handling equipment.
- G. Surfaces to be painted shall be wiped, scraped, or wire-brushed as necessary to a clean, smooth painting surface, free from oil, rust and dirt. All material and equipment that is furnished with a factory prime coat of paint, which is damaged in transit, during storage, or from exposure to weather, shall be prime painted.

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- H. Contractor shall be responsible for costs related to damage caused by leaks in piping systems, or any other malfunction of the equipment, materials, systems, or work, including repairs, replacements, etc.
- I. Contractor shall provide information to other Contractors relative to all required duct or pipe penetrations in walls, floors, roofs etc. The Contractor shall provide information to other Contractors relative to roof curbs. Structural work shall not be altered in any way.
- J. All necessary cutting and patching of roofs, walls, floors, ceilings, etc., as required for the proper installation of the work under this section, shall be performed, and in a neat and workmanlike manner. No joists, beams, girders, columns, or other structural member shall be cut.
- K. Contractor to provide all scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises for all equipment and materials, and remove same from premises when no longer required.
- L. Carefully lay out work on the premises and make proper provision for the other work. The exact location of each item shall be determined by reference to the drawings, by measurements at the building, and in cooperation with other contractors. Be responsible for accurately locating all openings for ducts, pipes, etc., and all access doors required.
- M. Schedule and coordinate work so as to execute expeditiously the contract and to avoid unnecessary delays.
- N. Examine fully the specifications and drawings for other trades, to become familiar with all conditions affecting work, and consult and cooperate with other trades for determining space requirements and adequate clearances with respect to other equipment in the building. School District Representative shall determine space priority of the trades in the event of interference between ductwork, piping, conduit, and equipment of various trades.
- O. If the work is installed without coordinating with other trades, and the installation interferes with their installation, the contractor shall make any changes necessary in this work to correct conditions without extra charge.

1.11 ELECTRIC

- A. Coordinate the voltage and phase characteristics of each HVAC unit and motor with the electrical shop drawings.
- B. Do not exceed electrical requirements of HVAC equipment without fully disclosing this information to the School District Representative.
- C. Motors shall be suitable for non-overloading operations, regardless of operating conditions, and shall be capable of continuous operation at full nameplate rating. Motor speed shall be a maximum of 1750 RPM, unless otherwise noted.
- D. Motors for belt drive shall have adjustable bases with set screw to maintain belt tension. Motor horsepower indicated on the drawing equipment schedules are the minimum size acceptable.
- E. NEMA Standards shall be taken as minimum requirements for motor design and performance. Motors shall be suitable for load, duty, voltage, frequency, hazard and for service and location intended. Motors shall be high efficiency type.

- F. Motors shall have name plate giving manufacturers name, shop number, HP, RPM and current characteristics. Motors for outdoor service shall be TEFC.

1.12 MOTOR STARTERS

- A. Provide motor starters for all HVAC and other mechanical equipment. Provide correct size and voltage characteristics per electrical requirements. Motor starters shall be provided by Division 23 and coordinated with electrical drawings.

1.13 EQUIPMENT SUPPORTING PROVISIONS

- A. Contractor shall confirm locations with School District Representative before installation of hangers, curbs, platforms, equipment frames, etc. Contractor shall coordinate all related work with other trades.
- B. Equipment schedules on the drawings indicate a particular manufacturer for all equipment and the architectural and structural drawings indicate supports and other design considerations which were based on the use of this equipment.
- C. Contractor shall confirm all support dimensions and locations based on the actual equipment to be installed and shall coordinate all related work with other Contractors.
- D. Mechanical equipment drawing schedules indicate a particular manufacturer for equipment and the structural drawings indicate supports and other design considerations that were based on the use of this equipment. If the Contractor chooses to furnish items other than those indicated, they shall assume all responsibilities and additional costs for the furnishing and installation of the proper steel framing.
- E. Where supports, foundations, stands, suspended platforms for equipment are indicated on drawings or specified in specifications design and construct supporting structures of strength to safely withstand stresses to which they may be subject and to distribute properly the load and impact over building areas. Conform to applicable technical societies' standards, also to codes and regulations of agencies having jurisdiction. Contractor shall provide sufficient supports as required. These supports are for foundations, supporting stands, platforms and they shall be connected to the building structural members. All equipment shall be bolted to supports, foundations, stands and platforms. Design of the supports, foundations, supporting stands and platforms must be approved by a California State Licensed Structural Engineer.

1.14 MACHINERY DRIVES AND ACCESSORIES

- A. Belt drives: Use approved V-belts of the proper number and size, complete with the necessary grooved sheaves and other requisite accessories. Belts for motors shall be capable of not less than 20% in excess of actual motor size used on the job.
- B. Belt guards: All belt drivers shall be protected with belt guards, enclosing both the driving and the driven pulleys, securely fastened in place and provided with removable covers at each shaft center. Belt guards shall comply with all code requirements.
- C. Sheaves: All motor sheaves shall be of the variable pitch type unless otherwise noted. Pitch of variable pitch sheaves shall be selected at approximately 50% of the variable pitch range.

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- D. Provide guards for all exposed couplings on rotating equipment.

1.15 LUBRICATION

- A. Lubricate as required all motors, bearings, fans, etc., before operation of any equipment.
- B. Provide a final lubrication to all equipment requiring it before turning over the system to the Owner.

1.16 PIPE SLEEVES

- A. Sleeves shall be schedule 40 galvanized steel pipe.
- B. Pipe motion due to expansion and contraction will occur, make sleeves of sufficient diameter to permit free movement of pipe. Where pipes are insulated, make sleeves of sufficient diameter to pass pipe insulation. Check floor and wall construction and finishes to determine proper length of sleeves for various locations. Terminate sleeves flush with walls, partitions and ceiling. Extend sleeves 1/4" above finish floor, except in equipment rooms and other areas where water may accumulate on floor, extend to 1-1/2".
- C. Set sleeves in ample time to permit pouring of concrete or to allow progression of other work as scheduled. Fasten sleeves securely so that they will not become displaced when concrete is poured or when other construction around them. For sleeves in fire walls, pack space between sleeve and pipe with approved non-combustible material and as otherwise required by local code; for floors where water is to be kept out, fill with graphite packing and caulking compound.
- D. Sleeves in underground walls shall be 1-1/2" larger than outside diameter of pipe. The space between sleeve and pipe shall be sealed with 1" long wool and 1/2" water tight flex caulking on both sides of the wall. The seal shall be guaranteed watertight.

1.17 ESCUTCHEONS

- A. Provide 20 gauge escutcheons at all pipe penetrations in walls, ceilings and floors. Escutcheons shall be one piece or hinged two piece type with positive latch or setscrew, and shall be polished chrome plated in finished rooms, and polished brass in other areas. Escutcheons shall have tempered springs or other means to insure positive attachment to pipe. The escutcheon opening shall be of sufficient diameter to fit around the insulation of insulated pipes, and the outside diameter of the escutcheon shall be of sufficient size to conceal the pipe sleeves.

1.18 EXPANSION AND FLEXIBILITY

- A. Install all work with regard for expansion and contraction to prevent damage to the piping, ductwork, equipment and the building and its contents. Provide piping offsets, expansion loops, approved type expansion joints, anchors or other means to control pipe movement and to minimize pipe forces.

1.19 ACCESS PANELS/DOORS

- A. Provide access panels/doors. Refer to other Division 23 Sections for further reference. Provide access panels/doors with have same fire rating as ceiling, wall or duct in which they are installed, and shall be of sufficient size to provide the required accessibility.
- B. Provide access panels/doors where necessary to provide access to concealed volume dampers, water hammer arrestors, trap primers, cleanouts, shut off valves, control valves etc.
- C. Access doors:
 - 1. Material and Manufacturer: Stainless Steel Series is 16 gage #304 stainless steel door and frame. Provide cylinder key lock. Equal to MIFAB UA-SS. All MIFAB cylinder locks are keyed alike.
 - 2. Sizes shall be 14" X 14" at easily accessible valves, water hammer arrestors, trap primers, cleanouts etc; 18" X 18" where partial body access is required; 24" X 24" where entire body access is necessary.
 - 3. Confer with other contractors with respect to access panel locations and shall wherever practicable group mechanical and electrical equipment in such a way as to be accessible from a single panel and reduce number of doors required.

1.20 CORROSION PROTECTION

- A. Any piping passing through concrete floors, walls or roofs shall be sleeved and wrapped 3 times with plastic foam wrap. Provide epoxy joint sealer, non-shrink, waterproof caulking around all piping risers coming up through concrete floors & sidewalks. If the floors, walls or roofs are existing then core these areas. Provide foam sealant and epoxy joint sealer (non-shrink) waterproof caulking around the space between the pipe and the floors, walls or roofs.

1.21 FIRE STOPPING

- A. Provide fire stopping at all rated floors, walls or roofs. Use UL listed materials and methods for sealing these areas.

1.22 IDENTIFICATION OF EQUIPMENT

- A. Each item of equipment shall be permanently labeled with a plastic nameplate of sufficient size to clearly indicate the identification designation appearing on the construction drawings. Letters shall be a minimum of 2 inches high.

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1.23 GENERAL TESTING REQUIREMENTS FOR EQUIPMENT

- A. The following requirements are supplementary to tests specified for individual equipment or systems in other Division 23 sections:
1. Furnish labor, materials, instruments, electric power, etc., and bear all costs in connection with these tests.
 2. Give a minimum of 72 working hour notification to the School District Representative when tests will be conducted. Coordinate test with other trades.
 3. After the work has been completed, subject all systems to acceptance tests under normal operating conditions for periods of 5 working days to show compliance with Contract requirements. Submit to the School District Representative a written certificate that all tests have been performed in accordance with the specification requirements.
 4. All equipment, fans, and motors shall run at their required speed without showing undue vibration, objectionable noise, or sparking for a period of 5 working days.
 5. Balance individual units and adjust dampers, registers, diffusers, etc., so that they deliver air quantities indicated for each outlet, and inlet, or as required.
 6. Submit to the School District Representative a written certificate that all tests have been performed in accordance with the specification requirements.
- B. Adjustments, repairs, and re-tests:
1. Make adjustments, repairs and alterations, as required to meet specified test results.
 2. Correct defects disclosed by tests or inspections, and replace defective parts when directed.
 3. In replacing defective parts, use only new materials, and in the case of pipe, replace with same length as defective piece.
 4. Repeat tests after defects have been corrected and parts replaced, as directed and until pronounced satisfactory.
 5. Bear the cost of repairs, and restoration of the work by other Contractors that have been damaged by the tests.

1.24 RECORD DRAWINGS

- A. Maintain at the site, a set of record drawings, upon which shall be clearly indicated (by shading, coloring, or some other acceptable method) the day by day extent of the work installed. Indicate all changes to the original design at the end of each day.

- B. At the completion of the construction phase, furnish to the School District Representative all necessary drawings showing work which was not installed as shown in the contract drawings. A minimum of one set of originals and three copied sets shall be furnished. Indicate all pertinent information, i.e., valve locations, pipe and duct routing (dimensionally located), etc. All underground piping shall be located on the record drawings by two or more dimensions. All elevations (inverts) shall be shown with the point of elevation change clearly located. All valves shall be numbered and lettered to correspond with the numbers and letters on the site.

1.25 EMERGENCY REPAIRS

- A. The Owner reserves the right to make emergency repairs as required to keep systems in operation without relieving the Contractor of his responsibilities during the post/partial beneficial occupancy.

1.26 OPERATION BY OWNER

- A. The Owner may require operation of parts or all of the respective installations prior to final acceptance. The Owner shall pay for cost of utilities for such operation. Operation of the installation shall not be construed as acceptance of the work.

1.27 INSTRUCTION MANUAL

- A. Prior to completion of installation and final inspection of work, furnish to the School District Representative a minimum of three copies of complete instruction manual, bound in booklet form and indexed for each respective trade.
- B. Manual shall contain the following items:
 - 1. List of all equipment with manufacturer's name, model number and local representative, service facilities, and normal channel of supply for each item.
 - 2. Manufacturer's literature describing each item of equipment with detailed parts list.
 - 3. Detailed step-by-step instructions for starting, summer operation, winter operation, and shutdown of each system.
 - 4. Detailed maintenance instructions for each system and piece of equipment.
 - 5. Copy of each automatic control diagram with respective sequence of operations.
 - 6. Individual equipment guarantees.
 - 7. Certificates of inspections.
 - 8. Copies of as-built construction and related shop-drawings.
 - 9. All written material contained in manual shall be typewritten.

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1.28 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to acceptance of work and during time designated by the School District Representative provide necessary qualified personnel to operate each system for a minimum period of two consecutive, full working days. During the two working days provide training for each system.
- B. During operating period, fully instruct School District Facility Representatives in complete operations, adjustment, and maintenance of each respective installation.

1.29 GUARANTEES AND WARRANTIES

- A. All work shall be guaranteed to be free from defects in material and workmanship for a period of one year from the date of final acceptance of the work, or a longer period if stipulated under specific headings. Replace at no additional cost any material or equipment developing defects and also pay for any damage caused by such defects, or the correction of defects.
- B. Use warrantee terms for specific items of equipment, relative to the work guarantee requirements of this specification.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 23 05 00

TESTING, ADJUSTING, AND BALANCING FOR HVAC SYSTEMS

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Testing, adjusting, and balancing of air systems.

1.02 SUBMITTALS

- A. Draft Reports: Submit for review prior to final acceptance of Project.
- B. Test Reports: Submit prior to final acceptance of Project and for inclusion in operating and maintenance manuals. Assemble in soft cover, letter size, 3-ring binder, with table of contents page and tabs, and cover identification. Include reduced scale drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
- C. Refer to air balance notes on drawing M2.0

1.03 BALANCING AND ADJUSTING

- A. This section covers testing and balancing of environmental systems including air distribution systems, and the equipment and apparatus connected thereto. The testing and balancing of all environmental systems shall be the responsibility of one Testing, Balancing and Adjusting (TBA) firm. The minimal standards to be met are those set forth in Chapter 40 in the latest edition of the ASHRAE Systems Handbook.
- B. The balancing, testing and adjustments of the complete mechanical systems shall be the direct responsibility of the Contractor and he shall engage the services of an independent firm specializing in this work. The definition of independent shall mean the firm is not associated with any contracting or manufacturing firm and derives its income solely from testing, adjusting and balancing mechanical systems. Acceptable testing, adjusting and balancing firms are those which are AABC certified. NEBB firms must also be AABC certified.
- C. The balancing work shall be performed by the same firm having total professional responsibility for the final testing, adjusting, and balancing of the entire system.
- D. Testing and balancing work shall be directly supervised and the results confirmed by a Registered Professional Mechanical Engineer who shall represent the TBA firm in progress meetings as requested, and shall be available for interpreting all material found in the balance report.
- E. The balancing firm shall provide all tools, equipment and instruments required and shall take all readings, and make all necessary adjustments.
- F. After all adjustments are made, prepare a detailed written report and submit for review. Report shall bear the Registered Professional Mechanical Engineer's Stamp of the

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person supervising the work. Final acceptance of this project will not be made until a satisfactory report is received.

- G. Verify the following conditions before proceeding with work:
1. Conduct site observations during construction to determine the location of required balancing devices and confirm that they are properly located and installed. Submit a written report of these observations to the Architect.
 2. Installation of the designated system is complete and in full operation.
 3. Outside temperature conditions, occupant loads, lighting loads, special equipment requiring extra sensible or ventilation requirements, and solar conditions are within a reasonable range relative to design conditions or provide for acceptable simulation of loads and conditions that will result in a properly balanced system.
- H. All thermal overload protection shall be observed and noted on the data sheets. If the starter equipment is furnished and installed by the Contractor and thermal overload protection is incorrect, such information shall be tabulated, including required size thermal overloads, and included in the report. If thermal overload protection is incorrect, it shall be the responsibility of the Contractor to see that proper overload protection is installed.
- I. Measure and set any special conditions such as minimum outside air quantities; check and adjust outside and return air intakes so that the system will deliver substantially the same volume on either; make tests and record data as required in the "Balancing Report" section. All balancing devices such as dampers and valves shall be clearly marked as to the final balanced position. Plug all test holes, replace access doors and belt guards.
- J. Provide temperature recorders for spaces as necessary to verify acceptable space temperature conditions.
- K. Upon request of the School District Representative a representative of the balancing firm performing the work shall demonstrate fluid flow quantities shown in the report by re-measuring outlets or terminals selected at random by the School District Representative to verify accuracy of settings.
- L. Requirements for balancing air systems are as follows:
1. Before any adjustments are made; the major items of equipment shall have been checked to assure all bearings have proper lubrication; all belt drives shall have been adjusted for proper alignment and tension; and the systems shall have been checked for such items as dirty filters, duct leakage, filter leakage, damper leakage, equipment vibrations, correct damper operations, etc.

2. Adjust fan systems, major duct sections, registers, diffusers, etc., to deliver design air quantities within plus or minus 5%. If individual air outlets serve more than one space, they may have a tolerance of 10% from the average. Design CFM is based on filters being approximately 50% loaded. Pressure drop across filters during balancing shall be simulated to that condition. After balancing is completed, verify that motor is not overloaded with the filters clean.
 3. Check and adjust CFM settings on diffusers and grilles.
 4. Adjust distribution systems to obtain uniform space temperatures free from objectionable drafts and noise within the capabilities of the system.
 5. Exchange and pay for sheaves and/or belts as required to adjust the rpm of fans to handle specified air quantity.
- M. Provide four copies of a "Balancing Report" to the School District Representative. The Mechanical Engineer shall review this report. This report shall contain a general information sheet listing instruments used, method of balancing, altitude correction calculations, manufacturer's grille, register, and diffuser data. Report shall contain the following additional data.
1. Equipment data sheets listing make, size, serial number, rating, operating data, etc., of all mechanical equipment including fans, motors, starters, and drives. Operating data shall include rotational speed, inlet and outlet pressures, pressure drop across filters, coils and other system components, and measured motor current and voltage.
 2. Balancing data sheets listing the required and actual CFM of all supply, return, and exhaust outlets or inlets, and totals summarized by systems.
 3. A reduced set of contract drawings with outlets marked thereon for easy identification of the designation used in the data sheets.
 4. Listing of any abnormal or notable conditions not covered in the above.
- N. Even though it is the responsibility of the balancing firm to check the physical operation of each operating piece of equipment, the control contractor must assure the balancing firm that all controls are accurately calibrated and must cooperate with him during the balancing work period.
- O. The agency performing the system balance and performance test, shall personally verify that all system control functions and interlocking do in fact provide the desired results as stated. The agency shall provide a written statement within the air balance report verifying this fact.

**PART 2 – PRODUCTS
(NOT APPLICABLE)**

PART 3 - EXECUTION

3.01 EXAMINATION

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- A. Before starting work, verify systems are complete and operable.
- B. Report defects, deficiencies, or abnormal conditions in mechanical systems preventing system balance.
- C. Beginning of work means acceptance of existing conditions.

3.02 INSTALLATION TOLERANCES

- A. Included in scope of work is to test and balance all three systems that serves area of work (AC/B4, AC/B9 and AC/B10)
- B. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- C. Air Outlets and Inlets: Adjust to within plus or minus 10 percent of design.

3.03 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to deliver design supply, return, and exhaust air quantities within previously stated tolerances.
- B. Make air quantity measurements in ducts by traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Use volume control devices to regulate air quantities only to extent those adjustments do not create objectionable air motion or sound levels. Change volume using dampers mounted in ducts.
- E. Vary total system air quantities by adjustment of fan speeds. Provide drive changes to accomplish system air flow. Vary branch air quantities by damper regulation.
- F. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across fan. Allow for pressure drop equivalent to 50 percent loading of filters.
- G. Adjust automatic outside air, return air, and exhaust air dampers for design conditions.
- H. Measure temperature conditions across outside air, return air, and exhaust air dampers to check leakage.
- I. At modulating damper locations, take measurements and balance at extreme conditions.
- J. Systems shall be tested for heating and or cooling operation and when is on economizer cycle. TAB report must include tables for both. Refer to drawing M0.1 general note #20.

3.04 FIELD QUALITY CONTROL

- A. Verify recorded data represents actually measured or observed conditions.
- B. Permanently mark settings of valves, dampers, and other adjustment devices. Set and lock memory stops.

END OF SECTION

SECTION 23 07 00

HEATING VENTILATING AND AIR CONDITIONING INSULATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide labor, equipment and materials, and perform all operations necessary for the installation of insulation as indicated. This section includes thermal insulation ductwork.
- B. Provide complete Insulation Submittals and Shop drawings. Refer to Section Heating Ventilating and Air Conditioning 23 01 00 paragraph 1.4 Submittals - Shop Drawings/Product Data/Material Certifications.

1.02 RELATED SECTIONS

- A. Section 23 01 00 General Provisions for Heating, Ventilating and Air Conditioning
- B. Section 23 20 00 Heating, Ventilating and Air Conditioning Systems

1.03 FIRE HAZARD CLASSIFICATION

- A. Insulation shall have a composite (insulation, jacket or facing, and adhesive to secure jacket or facing) fire hazard rating as tested by ASTM E84, NFPA 255, or UL 723 not to exceed 25 flame spread and 50 smoke developed. Materials labeled accordingly.
- B. Insulation shall conform to current California Mechanical Code.

1.04 QUALITY ASSURANCE

- A. Furnish insulation systems to the project site bearing the manufacturer's label.
- B. Appearance shall be of equal importance with its mechanical correctness and efficiency.

1.05 PROTECTION

- A. Protect insulation against dirt, water, chemical, or mechanical damage before, during and after installation. Any such insulation or covering damaged prior to final acceptance of the work shall be satisfactorily repaired or replaced.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

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1.07 SUBMITTALS

- A. Comply with specification Section 23 01 00 General Provisions for Heating, Ventilating and Air Conditioning.
- B. Required Submittals
 - 1. Ductwork insulation, jackets, and lining.
 - 2. For each product being submitted, provide product description, list of materials, thickness, location of use and manufacturer's installation instructions.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Acceptable manufacturers for insulation are Johns Manville Corporation, Owens-Corning and Knauf.
- B. Acceptable manufacturers in addition to insulation manufacturers for adhesives, sealants and coatings are Foster Products.
- C. Duct tape is not an approved sealer tape and shall not be used on this project.

2.02 DUCT WORK INSULATION

- A. Ductwork insulation R value must comply with 2019 California Building Energy Efficiency Standards Table 150.1.A or below whichever is more stringent.
- B. Flexible Fiberglass Insulation Wrap Blanket: Johns Manville Microlite Type 100 meeting ASTM C1290 - 11 or equal, Type II, Class B-2; flexible blanket, Class 1 not to exceed 25 flame spread and 50 smoke developed. All flexible fiberglass insulation wrap blanket insulation shall have foil back jacket.
 - 1. 'K' ('KSI') Value: 0.25 at 75 degrees F (0.040 at 24 degrees C) installed.
 - 2. Vapor Barrier Jacket: FSK, Aluminum foil reinforced with fiber glass yarn and laminated to fire-resistant kraft, secured with UL listed pressure sensitive tape and/or outward clinched expanded staples and vapor barrier mastic as needed. All insulation and jacket material shall be plenum rated.
- C. Rectangular Duct Liner: Johns Manville Linacoustic Mat Faced or Permacote meeting ASTM C1071 or equal; flexible blanket.
 - 1. 'K' ('KSI') Value: ASTM C518, 0.25 at 75 degrees F (0.036 at 24 degrees C).
 - 2. Noise Reduction Coefficient: .65 or higher based on "Type A mounting". Comply with ASTM C423A Absorption Coefficients, ASTM E84, UL 723 and NFPA 255.
 - 3. Maximum Velocity on Mat or Coated Air Side: 4,000 ft/min.

4. Adhesive: UL listed waterproof type.
 5. Fasteners: Duct liner galvanized steel pins, welded or mechanically fastened.
 6. Absolute roughness of exposed surface not to exceed 0.0013 coated.
- D. Round Duct Liner: John Manville Spiracoustic Plus, meeting ASTM C1071 or equal; rigid.
1. 'K' ('KSI') Value: ASTM C518, 0.23 at 75 degrees F (.033 at 24 degrees C).
 2. Noise Reduction Coefficient of .70 as per ASTM C1071.
 3. Maximum Velocity: 4000 ft/min (20.3 mm/sec)
- E. Rectangular and round duct liner shall comply with the requirements of NFPA 90A and the "Application Standards for Duct Liners" of SMACNA. Duct liner shall be glass fiber insulation with exposed surface coated to prevent fiber erosion at air velocities up to 4000 fpm. Duct sizes for lined duct show the clear dimension inside the lining.

2.03 FIRE STOPPING INSULATION

- A. Fire stop insulation shall be ceramic fiber blanket equal to Morgan Thermal Ceramics "Cerablanket" or USG Therma-fiber 6 lb. density, Class 1 not to exceed 25 flame spread and 50 smoke developed.

PART 3 - EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Verify that ductwork has been pressure tested for leakage in accordance with SMACNA standards before applying insulation materials.
- B. Verify that all surfaces are clean, dry and free of foreign material. Apply insulation on clean, dry surfaces free of any foreign matter and only after tests and approvals required by the specifications have been completed.

3.02 GENERAL INSTALLATION

- A. Install materials in accordance with manufacturer's recommendations, building codes and industry standards.
- B. Continue insulation vapor barrier through penetrations except where prohibited by code.
- C. Insulation shall be installed by workmen regularly engaged in this kind of work in accordance with the manufacturer's recommendations.
- D. All exposed raw edges shall be finished with finishing cement.
- E. If staples are used, all must be coated with adhesive to maintain vapor barrier integrity. Thickness per ASHRAE Standards Table.

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3.03

3.04 FLEXIBLE FIBERGLASS INSULATION WRAP BLANKET INSTALLATION AND SCHEDULE

- A. All insulation shall be applied with edges tightly butted with facing overlapping all joints at least 2". All external insulation shall have foil backed vapor seal. Joints shall be sealed with fire retardant adhesive. The insulation shall be secure to the duct with approximately 4" wide strips at 8" O.C. of fire retardant adhesive. Where the duct width exceeds 30", the underside insulation shall be additionally held in place with mechanical fasteners on about 18" maximum centers.
- B. All breaks and punctures shall be sealed with vapor barrier tape and fire retardant adhesive.
- C. Provide all insulated ductwork conveying air with foil backed jacket. Seal all jacket seams and penetrations with UL listed tapes or vapor retardant adhesive. Where service access is required, bevel and seal ends of insulation.
- D. Continue insulation through walls, sleeves, hangers, and other duct penetrations except where prohibited by code.
- E. The underside of duct work 24" or greater shall be secured with mechanical fasteners and speed clips spaced approximately 18" on center. The protruding ends of the fasteners should be cut off flush after the speed clips are installed, and then, when required, sealed with the same tape as specified above.
- F. For ductwork exposed to physical abuse in finished spaces, finish with Johns Manville Zeston® 2000 PVC jacket or aluminum jacket.

G. Flexible Fiberglass Insulation Wrap Blanket Schedule

1. Flexible Fiber Glass

a. Supply and Return Ducts @ HVAC units:

1 1/2 inch thick Foil Back Min R-8

b. Supply and Return Plenums @ HVAC units:

1 1/2 inch thick Foil Back Min R-8

2. Rigid Fiber Glass

a. Supply and Return Ducts @ HVAC units

1 1/2 inch thick Foil Back Min R-8

b. Supply and Return Plenums @ HVAC units

1 1/2 inch thick Foil Back Min R-8

3.05 DUCT LINER INSULATION INSTALLATION AND SCHEDULE

- A. Duct liner shall be used for all square and rectangular ducts. Duct liner shall be installed in all supply and return air ducts. Duct liner shall also be installed where indicated on the drawings.
- B. Duct linings shall be interrupted at fire dampers and fire doors so as not to interfere with their operation. Duct coverings and linings shall also be interrupted at the immediate area of operation of heat sources in a duct system involving electric resistance or fuel burning heaters.
- C. All portions of duct designed to receive duct liner shall be completely lined on the interior with acoustical lining as specified herein. Transverse joints shall be neatly butted and there shall be no interruptions or gaps.
- D. The coated surface of the lining shall face the airstream.
- E. The lining shall be adhered to the sheet metal with 100% coverage of adhesive, and all exposed leading edges and all transverse joints coated with adhesive.
- F. The lining shall be additionally secured with mechanical fasteners that shall compress the duct liner sufficiently to hold it firmly in place.
- G. The lining shall be cut to assure overlapped and compressed longitudinal corner joints.
- H. Duct dimensions indicated are net inside dimensions required for airflow. Increase duct size to allow for insulation thickness.
- I. Sizes noted on drawings are clear cross-section area (inside the lining).

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- J. For velocities up to 2,000 fpm, duct liner shall be applied with 100% coverage of fire retardant adhesive. Duct liner shall be cut to assure snug corner joints. The coated or most dense surface of the liner shall face the air stream. The liner shall be additionally secured with mechanical fasteners that shall compress the duct liner sufficiently to hold it firmly in place. They shall start within 3" of the leading edge of each duct section (and any line transverse joints within the duct section) and shall be spaced no more than 12" O.C. around the perimeter of the duct, except that they need to be no closer than 9" to a corner break. Elsewhere, they shall be a maximum of 18" O.C., except that they shall be placed not more than 6" from a cut edge nor 12" from a corner break. All exposed edges and the leading edge of all cross-joints of the liner shall be coated with the same adhesive used to secure the duct liner to the metal surface. For velocities between 2,000 and 4,000 fpm, installation shall be same except that mechanical fasteners shall be spaced no more than 6" O.C. around the perimeter of the duct, except that they need be no closer than 6" to a corner break. Elsewhere, they shall be a maximum of 10" O.C., except that they shall be placed not more than 6" from a cut edge nor 12" from a corner break.
- K. Adhesive shall conform to ASTM C916-85
- L. Mechanical fasteners shall conform to Mechanical Fastener Standard MF-1-1975, available from SMACNA.
- M. Adhere insulation to sheet metal with full coverage of a UL listed adhesive.
- N. Secure insulation with mechanical liner fasteners as indicated by SMACNA or manufacturer. Pin length should be as recommended by the liner manufacturer.
- O. All exposed edges of the liner must be factory or field coated. For systems operating at 4000 fpm or higher a metal nosing must be installed in all liner leading edges.
- P. Repair liner surface penetrations with UL listed adhesive.
- Q. Duct Liner Insulation Schedule - Rigid Fiber Glass
 - 1. Supply and Return Ducts as noted on drawings
 - 1 inch thick or thicker with insulation value of minimum R-6 LINACOUSTIC, PERMACOTE or equal

END OF SECTION

SECTION 23 20 00

HEATING VENTILATING AND AIR CONDITIONING SYSTEMS

PART 1- GENERAL

1.01 SUMMARY

- A. Work under this section provides materials and equipment related to Heating, Air Conditioning and Refrigeration systems.
- B. Provide complete Mechanical Submittals and Shop drawings. Refer to Section Heating Ventilating and Air Conditioning System General Provisions 23 01 00 paragraph 1.4 Submittals - Shop Drawings/Product Data/Material Certifications.

1.02 RELATED SECTIONS

- A. Section 23 01 00 - Heating Ventilating and Air Conditioning Systems General Provisions.
- B. Section 23 07 00 - Heating Ventilating and Air Conditioning Insulation.

1.03 DEFINITIONS

- A. Ductwork Sizes: Inside clear dimensions. For acoustically lined and internally insulated ductwork, maintain ductwork sizes inside lining or insulation.
- B. Low Pressure: Static pressure in duct 2" water gauge or less, velocity 2000 fpm or less.

1.04 EQUIPMENT AND COMPONENTS REVIEW

- A. Only equipment and components from those manufacturers indicated in this specification are acceptable.
- B. Products from manufacturers which have not previously been thoroughly reviewed and accepted by the School District Representative before the bidding period will not be considered.

1.05 SUBMITTALS

- A. Comply with specification Section 23 01 00 General Provisions for Heating Ventilating and Air Conditioning Systems.
- B. Require Completed Submittals
 - 1. Duct work fittings and accessories.
 - 2. Sealant.
 - 3. Access panel and doors.
 - 4. Grilles, registers, and diffusers.
 - 5. Exhaust fans.

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- C. Required Shop Drawings
 - 1. Routing of all duct systems.
 - 2. Equipment layout.

PART 2 - PRODUCTS

2.01 SHEET METAL

- A. Unless otherwise specified, sheet metal used for duct and plenum construction shall be G90 coated galvanized steel of lock forming grade conforming to ASTM standards A653-11. All duct work and supports shall be galvanized. All sheet metal round ducts shall be round spiral lock-seam construction. "Knock down" (KD) duct is not acceptable.
- B. The gauge of the duct and its construction shall be based on low pressure or medium pressure or low or medium velocity. The velocities can be obtained by the duct size and CFM values listed on the drawings. The static pressure for various systems is listed on the mechanical equipment schedule. Refer to the SMACNA standards for the correct duct construction based on the velocities and static pressures involved.
- C. Sealing of Duct Work: All supply and return duct work from mechanical units, all exhaust duct work and all outside air duct work shall have a high pressure Class A seal per SMACNA.
- D. Alumiflex type duct will not be permitted on this project. All ducts are to be rigid galvanized sheet metal.
- E. Exposed round ductwork shall be equal to McGill Round Uni-Light spiral duct, manufactured from G90 galvanized sheet steel meeting ASTM A653-11 (lock forming quality) or equal. The duct and fittings shall be assembled with United Uni-Ramp joints or equal, using sheet metal screws.
- F. All ductwork, fittings, transitions, and hangers exposed to view shall be painted. Provide primer and final coat on all exposed ductwork. The color of the final coat of paint shall be selected by the School District Representative.
- G. All fittings shall be standard design fittings from the same manufacturer as the duct. Branch takeoffs shall be set at 45° to the trunk duct in the direction of the air flow with factory made fittings. All reductions in duct size shall be made in factory fabricated reducing fittings. Elbows with heel taps are not acceptable.
- H. All factory fabricated fittings and joints must be joined using sheet metal screws and duct sealing compound. Ducts made up with sealer shall have a minimum of 2" overlap and sealed with duct sealing compound applied to both parts for the full length of the overlap.

2.02 FLEXIBLE DUCT

- A. Flexible duct shall only be permitted in concealed tee bar ceilings and at the end of duct run-outs to diffusers or grills. No flex duct shall be exposed to view. The maximum flex length shall be 7 feet.
- B. Flexible ducts shall be installed in as straight a manner as possible. Avoid bends with inside radius of less than one duct diameter. Cut ducts to length required, rather than using bends to take up slack.
- C. Flexible duct shall comply with the UL 181 Class I requirements of the current edition of the California Mechanical Code with a flame spread rating 25 or less and smoke developed rating not higher than 50.
- D. All flexible ducts shall be insulated. Insulation shall be fiberglass with an "R" value of 8.
- E. Flexible Ductwork – Manufactured with a fiberglass scrim reinforced, metallized polyester jacket and polymer water proof liner. Duct shall be factory made and consist of an interior liner that is moisture proof. Interior liner material shall be polymer type. Interior liner shall be air and water tight.
- F. Flexible Ductwork shall be ATCO UPC #031 (R-8) UL 181, Class 1 Air Ducts or equal. Flex duct shall have R-8 double-layer core of each product and is to be wrapped in multiple thicknesses of fiberglass insulation. Jacket shall have rugged and durable fiberglass scrim reinforced, metallized polyester jacket.
- G. Flexible Duct work - All thermal performance (R-Values) are classified by Underwriters Laboratories in accordance with ADC Flexible Duct Performance and Installation Standard using ASTM C518-10, at installed wall thickness, on flat insulation only. Rated Positive Pressure: 10" w.g. per UL 181 (UL Listed pressure ratings are determined in straight lengths @ ambient temperatures.) Recommended Operating Pressures: (Determined in a 90° bend at elevated temperatures in accordance with ADC FD 72-R1 Test Code.) Maximum Positive: 6" w.g. - 4" thru 12" Dia. 4" w.g. - 14" thru 20" Dia. (With factory installed metal collars, 2" w.g. - all diameters). Maximum Negative: 3/4" w.g. - all diameters. Maximum Velocity: 5,000 FPM.

2.03 ROUND DUCT TAKE-OFF FITTINGS

- A. Take-off fittings for all rigid round ducts shall be at 45 degree angles to the main duct or use a bellmouth fitting. Provide quadrant damper at duct take-off fitting unless otherwise specified.

2.04 DUCT SEALANT

- A. Acceptable manufacturers are Ductmate® Industries – PROseal® and FIBERseal®; and Hardcast, Inc – Sealing System.
- B. Metal to Metal - Duct sealer shall be flexible and self-curing and comply with UL 723 and UL 181B.
- C. Flex Duct - Duct sealer shall be flexible and self-curing and comply with UL 723 and UL 181B-M.

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- D. Sealant shall have a flame spread less than 25 and the smoke developed less than 50 when dry.

2.05 ACCESS PANELS AND DOORS

- A. Acceptable manufacturers are Ventfabrics, Inc., C. E. Sparrow Co. and Elmdor / Stoneman MFG.
- B. Access panels in sheet metal work shall consist of three one-piece stampings: the door frame, the door itself and the pan. Space between door and pan shall be filled with 1" thick insulation. The door shall be hung with loose pin hinges.
- C. Access panel sizes shall be as follows unless otherwise specified on drawings:

Size of Duct to be Accessed	Panel Size	Metal Gauges of		
		Frame	Door	Pan
6" - 8"	6" x 8"	24	26	28
10" - 12"	10" x 12"	22	24	28
12" - 16"	12 x 16"	20	24	28
18" and over	16" x 24"	20	22	28

- D. Access doors shall be fabricated in accordance with the details in the SMACNA Duct Construction Standards. Latches and hinges shall be equal to Ventlok of appropriate type and size.

2.06 TURNING VANES

- A. Acceptable manufacturers are Tuttle & Bailey, Invensys Eurotherm (Barber-Colman) and AeroDyne Research.
- B. Turning vanes shall be double-walled and formed to assure that any point on one blade is equidistant from the same point on an adjacent blade.

2.07 BACKDRAFT DAMPERS

- A. Gravity backdraft dampers shall be fabricated multi-blade, parallel action, gravity balanced backdraft dampers of galvanized steel or extruded aluminum, with center pivoted blades linked together; with sealed edges, steel ball bearings, and a plated steel pivot pin.

2.08 GRILLES, REGISTERS AND DIFFUSERS

- A. Acceptable manufacturers are Price, Krueger or Titus.
- B. All units must be factory finished. Provide white color finish. Unit ratings shall be approved by ADC.
- C. Air flow tests and sound level measurement shall be made in accordance with applicable ADC equipment test codes and ASHRAE standards. Manufacturer shall certify catalogued performances and ensure correct application of air outlet types.

- D. Positions indicated are approximate only. Check location of supply, return and exhaust grilles and make necessary adjustments in position to conform architectural features, symmetry and lighting arrangement. See architectural reflected ceiling plans and interior elevations for additional information.
- E. Provide splay wires from air distribution to structural building members. Splay wires are used for seismic restraint and shall be attached at each corner with a minimum of 4 splays for each grill.
- F. For dry wall ceilings use "Rapid Mount" frames for access to volume dampers and other items.
- G. Supply Air Distribution - Provide the sizes listed on the drawings.

2.09 VOLUME CONTROL DAMPERS

- A. Acceptable manufacturer are Penn Barry, Metal Form Manufacturing Co. and Duro Dyne Corp.
- B. Provide tight close-off dampers at locations indicated on drawings or as needed for control of the air distribution system.
- C. Dampers shall have air loss (leakage), when closed, less than 1% of the full flow rate (based on approach velocity of 2,000 fpm) with a pressure differential across damper 4" static pressure or less.
- D. Construction shall be of No. 22 gauge galvanized blades.
- E. All control rods for volume dampers shall be continuous through-out blade and duct work. Provide locking quadrants and bronze end bushings.
- F. Provide locator flags at each damper adjusting arm consisting of a 12" length of yellow or orange engineering tape.
- G. Exhaust fan motors that are 115-volt, 1 phase.

PART 3 – EXECUTION

3.01 DUCT CONSTRUCTION AND INSTALLATION

- A. Ductwork construction and installation including sheet metal gauges, reinforcement, joint sealing, air leakage and details not specifically shown on the drawings shall be in accordance with SMACNA Publication HVAC Duct Construction Standards - Metal and Flexible current edition and SMACNA Publication Seismic Restraint Manual: Guidelines for Mechanical Systems current edition.
- B. Use Ductmate Duct Connection System for all transverse joints in ducts.

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- C. Seal seams, joints, duct connections, elbow gores with Hardcast high pressure Class A SMACNA sealant.
- D. Radius elbows shall have a center line radius equal to 1-1/2 times the duct width. Square throats will not be permitted on radius elbows. Square elbows shall have double thick turning vanes. Job fabricated turning vanes will not be accepted without prior approval.
- E. Provide all necessary dampers as required for proper adjustment and control of air distribution. All dampers shall have rigid bearings and locking quadrants which allow no rattling. All damper rods shall be marked to indicate the relative position of the damper blade with respect to the rod.
- F. All grilles, registers, and diffusers shall be set flush and true to the wall or ceilings to prevent air leakage around the edges. Provide plaster frames for all outlets in plaster or gypsum board.
- G. Provide 1" angle collars for all exposed ducts passing through roofs, ceilings, floors and walls. Anchor collars in position after installation is complete.
- H. At all places where inside of duct will be visible through return air grilles, louvers, etc., paint normally visible inside portion of duct with flat black paint.
- I. Install hinged doors on ductwork and housing to provide access to all parts of every automatic damper, and all other items requiring maintenance or inspection.
- J. Transitions in ductwork, in changing shapes and sizes, shall be made with angles not exceeding 15° wherever possible. Maximum divergence upstream of equipment shall be 30° and maximum convergence downstream shall be 45°.
- K. Where horizontal ducts pass through walls and vertical ducts pass through roof or floors, supporting angles shall be rigidly attached to ducts and to the wall, roof or floor. Angles shall be galvanized and of approved sizes to properly support the ductwork. The supporting angles shall be placed on at least two sides of the duct.
- L. Where horizontal ducts pass through walls and vertical ducts pass through roof or floors, the openings shall be tightly sealed off so as to provide a air and sound tight seal between duct and opening.
- M. Contractor shall not provide holes in the duct systems for the installation of hangers, conduits, etc. Coordinate work of all other trades so this will not be necessary.
- N. Ensure that interior of ducting is kept clean during building construction. Install plastic film over exposed duct openings as soon as ducts are installed.
- O. Locate duct with sufficient space around equipment to allow normal operating and maintenance activities.
- P. All supply air, return air, outside air and exhaust air ductwork joints and seams to be sealed through their entirety with high pressure Class A SMACNA duct sealant.
- Q. Complete metal ducts within themselves with no single partition between ducts. Where width of duct exceeds 18 inches, cross break for rigidity. Open corners are not acceptable.

- R. Lap metal ducts in direction of air flow. Hammer down edges and slips to leave smooth duct interior.
- S. Construct tees, bends and elbows with radius of not less than 1-1/2 times width of duct on center line. Where not possible and where rectangular elbows are used, provide approved type airfoil turning vanes.
- T. Clothes dryer exhaust ducts shall be fabricated with no screws or other penetrations into the air stream.

3.02 FLEXIBLE DUCTWORK

- A. Connect flexible ducts to metal ducts with metal draw bands plus sheet metal screws. Use crimp joints with bead for joining round duct sizes with crimp in direction of airflow.

3.03 ACCESS DOORS

- A. Provide access doors as specified for inspection and cleaning before and after coils, at volume dampers, and elsewhere as indicated or as required. Review locations prior to fabrication.
- B. Locate access doors for easy access. Doors should be located above accessible ceilings, whenever possible. Where access is required above gypsum board ceilings, coordinate location of access panel with Contractor. Coordinate location of access doors with other trades such that conduit and pipe does not prevent or interfere with access to ductwork.

3.04 DUCTWORK TESTING

- A. Leak test supply air ductwork during construction and prior to installation of duct wrap. Leakage shall not exceed of 1% of the total design CFM when tested at 1-1/2 times the design air pressure or the minimum requirement as set forth by SMACNA HVAC Duct Construction Standards. Notify School District Representative 24 hours in advance of test. Keep field records of tests and submit to Architect Mechanical Engineer Owner's Representative three copies of results.
- B. Retesting: Retest ductwork failing initial tests following correction of defective work. Requirements of initial tests shall apply.

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 2019 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 2019 California Building Code (CBC), Part 2, Title 24 CCR.
 - 5.1.15 2019 California Fire Code (CFC), Part 9, Title 24, CCR.
 - 5.1.16 2019 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 CONDITONING (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.

26.3 Refer to MEP Component and Distributed Systems Anchorage and Bracing Notes on E1.0 for seismic bracing requirements.

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

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- 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.
- 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

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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 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 Alfex.
- 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 Alfex.
- 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 O.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.

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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 ½" for power wiring and ¾" for communications and fire alarm systems unless otherwise noted. Conduit in slab or below grade shall be ¾" 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.
- 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.

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- 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.
 - 4.31.2 All underground conduits shall be provided with minimum 24" radius elbows (vertical) and 60" (horizontal).

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- 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.

PART 3– EXECUTION

- 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

SECTION 26 55 60

DIMMING SYSTEM / THEATRICAL LIGHTING

PART 1 – GENERAL

1.1 Provide, install, and test an architectural lighting control system as specified herein for the areas indicated on the drawings and schedule(s).

1.2 Related Specification Sections

- 1.2.1 26 01 00 – General Provisions.
- 1.2.2 26 05 33 – Conduit and Fittings.
- 1.2.3 26 05 19 – Conductors.
- 1.2.4 26 05 34 – Outlet & Junction Boxes.

1.3 Division 26 Contractor shall coordinate all work described in this section with all other applicable plans and specifications, and shall perform the following:

Furnish and Install:

- 1.3.1 All power and control conduit systems and required backboxes, junction boxes and pull boxes.
- 1.3.2 Power feeders to the main equipment dimmer rack and control systems 120 volt power wiring, and all equipment grounding requirements.

Install:

- 1.3.3 Specialty backboxes provided by the theatrical lighting contractor.

1.4 Division 26 Contractor shall sub contract with a contractor who specializes in the installation of theatrical lighting systems. This sub contractor shall have qualifications as a direct factory dealer for the installed system. The theatrical lighting sub contractor shall perform the following:

Furnish and Install:

- 1.4.1 All dimmer and control racks, control electronics and consoles, remote control equipment and all other theatrical lighting equipment items specified in these specifications or on the drawings.
- 1.4.2 All theatrical lighting fixtures.
- 1.4.3 All specialty wiring devices and receptacles and control face plates.
- 1.4.4 All connector strips and other distribution equipment and all 120volt or low voltage control wiring associated with this equipment.

Provide:

- 1.4.5 Specialty backboxes.
- 1.4.6 Shop Drawings and equipment submittals.

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- 1.4.7 Testing & start-up and all owner training.
- 1.5 The entire control lighting system shall be listed by UL.
- 1.6 To ensure a uniform installation and single responsibility, the lighting control system shall be the product of one manufacturer. This manufacturer shall have manufactured electronic lighting controls for a minimum of 10 years. Companies who assemble dimming racks or banks from components supplied by others, even if that component is private labeled, are excluded from this bid. Mixing of equipment brands shall not be acceptable.
- 1.7 **The dimming system shall be manufactured by:**
 - 1.7.1 **Electronic Theater Controls, Inc.,**
 - 1.7.2 **Strand Lighting Controls**
- 1.8 The manufacturer shall have a factory authorized service center with at least one full time service technician on staff located within 100 miles of the job site. In addition, the manufacturer shall provide a 24-hour service hotline.
- 1.9 Installer Qualifications: An entity that specializes in the installation of theatrical lighting systems; that employs installers and supervisors who are trained and approved by the manufacturer.
- 1.10 The design drawings have been designed around equipment by equipment specified is the result of efforts on the part of the owner to select equipment for reliability, ease of maintenance and suitability for the owners' purposes. The base bid shall be for Electronic Theater Controls, Inc. Digital equipment manufactured by others will also be accepted provided it meets the requirements of the specification, and any revision or addition to the wiring required by substitute equipment shall be the responsibility of the substituting contractor. This contractor shall also be responsible for any additional architectural or engineering fees occasioned by the necessity of evaluating alternate proposals.
- 1.11 Fabrication - Fabrication shall begin only after approved drawings and a written notice to proceed have been delivered to the manufacturer at the manufacturer's place of business.
- 1.12 Energization - A qualified engineering representative employed full time by the manufacturer shall visit the job site after installation is complete and prior to the energization of the system to inspect, test and adjust the system. She/he shall also at that time instruct the owners' representatives in the operation and maintenance of the system. These services shall not exceed two days and shall be provided within 21 days written notice by the contractor.
- 1.13 Warranty: Manufacturer agrees to repair or replace components of the complete dimming control system and lighting luminaires that fail in materials or workmanship within specified warranty period.
 - 1.13.1 Lamps are not included as part of the special warranty.
 - 1.13.2 Warranty Period: Provide Cost to repair or replace parts for **two years** from date of Substantial Completion

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- 1.13.3 Extended Warranty Period: Provide Cost of replacement parts (materials only, f.o.b. the nearest shipping point to Project site), for **eight years**
- 1.13.4 Luminaires Warranty: Minimum warranty of 5 years full fixture coverage and 10 years LED array coverage
- 1.14 Submittal shall be made **within (20) working days** after the award of the contract by the District. This submittal shall include the following:
 - 1.14.1 Include name and qualifications of theatrical lighting sub-contractor who will be completing scope of work described in Section 1.4
 - 1.14.2 Complete bills of quantities, including all materials, components, devices, and equipment required for this work. The bills of quantities shall be tabulated respective of each and every system as specified
 - 1.14.3 Quantity of each type of equipment item.
 - 1.14.4 Description of each item.
 - 1.14.5 Manufacturer's Name and Model Number.
 - 1.14.6 Manufacturer's Specification Sheet.
 - 1.14.7 Equipment items which have individual components, will require that all component parts be listed individually.
 - 1.14.8 Include plans, elevations, sections, and mounting attachment details.
 - 1.14.9 Detail fabrication and installation for dimmer racks and arrangements, characteristics, and circuit assignments of various modules and rack-mounted accessories
 - 1.14.10 Elevation views of front, rear, and side panels indicating devices and controls, including illustrations and dimensioned outline drawings
 - 1.14.11 Include diagrams for power, signal, and control wiring. Show connections, circuits, and channel assignments
 - 1.14.12 Equipment legend showing a unified system of designations for lighting instruments, panels, dimmers, circuits, and equipment
 - 1.14.13 Coordination Drawings: Floor plans, reflected ceiling plan(s), and other details drawn to scale, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved
 - 1.14.13.1 Required working clearances for operation, maintenance, and environmental conditions
 - 1.14.13.2 Areas above and around dimming equipment where piping and ducts are prohibited
 - 1.14.13.3 Rack layout and relationships between components and adjacent structural and mechanical elements

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- 1.15 **Common submittal mistakes which will result in submittals being rejected:**
- 1.15.1 Not including the name and qualifications of a Theatrical Lighting sub-contractor.
 - 1.15.2 Not including all items listed in the above itemized description.
 - 1.15.3 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.
 - 1.15.4 Not including actual manufacturer's catalog information of proposed products.
 - 1.15.5 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

PRODUCT SUBSTITUTION.

- 1.16 All substitutions or alternate fixtures to those specified shall be submitted for approval (7) business days prior to the project bid date. Approvals when accepted will be issued in the form of an addendum. No consideration for substitutions will be provided after the award of the contract
- 1.16.1 The substitution request must include a statement indicating the difference in price of both the specified and alternate product, both contractor and list price. The substitution request must include a comparison of the total fixture wattage, total fixture lumens, fixture efficiency, fixture color fidelity and warranty comparison. Features, functional comparisons and costs of all other system components proposed as alternates must all be submitted.

DEFINITIONS

- 1.17 Fade Time: The time it takes all zones to fade from one lighting scene to another, with all zones arriving at the next scene at the same time
- 1.18 Control Voltage: As defined in NFPA 70, term for circuits and equipment operating at less than 50 V or for remote-control, signaling, and power-limited circuits
- 1.19 Scene: The lighting effect created by adjusting several zones of lighting to the desired intensity
- 1.20 Channel: An individual control output on a control console, accessed and regulated by a slider, switch, or button; or in some cases, accessed by a discretely assigned address and regulated by a data input apparatus

PART 2 - PRODUCTS

LUMINAIRES AND ACCESSORIES – GENERAL REQUIREMENTS

- 2.1 Comply with UL 1573 and listed and labeled by an NRTL.
- 2.2 Comply with the USITT DMX512-A standard.

- 2.3 Luminaires: Tested at LM-84 standards for all LEDs and successfully listed with a L70 rating of no less than 54,000 hours
- 2.4 Luminaires: Equipped with power lead cable, yoke with pipe clamp, safety cable for batten mounting, and filter holder
- 2.5 Metal Parts: Free of burrs, sharp corners, and edges
- 2.6 Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging
- 2.7 Luminaire Doors and Their Internal Access: Smooth operating, free of light leakage under operating conditions. Doors, lenses, diffusers, and other pieces arranged to prevent accidental falling during relamping and when secured in operating position
- 2.8 Power lead cable: 5' Neutrik powerCON™ to Twist-Lock connector
- 2.9 Luminaire Ventilation Openings: Baffled against light leaks.
- 2.10 Luminaire Operating Controls and Handles: Thermally insulated.
- 2.11 Lenses: Borosilicate glass in silicone mountings.
- 2.12 Framing Shutters: Stainless steel, four way; with each blade in a separate plane under adjustable tension mounting. Blades adjust plus or minus 30 degrees of rotation in gate for 120-degree-minimum total angular rotation between adjacent blades.
- 2.13 Color Filter Frame Holder: Attached to front of luminaire.
- 2.14 Luminaire Yoke: Rigid metal, arranged for vertical aiming of unit and equipped with T-bolt or hand screw to lock alignment

LUMINAIRES

- 2.15 Refer to the Lighting Fixture Schedule on the drawings for features of each specific luminaire type, luminaire options and the names of acceptable manufacturers. The use of a manufacturer's name on the Lighting Fixture Schedule is intended to establish a level of quality and is not intended to limit the selection of equal products from other manufacturers
- 2.16 Color mixing Light Emitting Diode Profile Fixture: Luminaires shall be a RGBL color-mixing high-intensity LED illuminator with DMX control of intensity and color. Light shall be projected through a gate where the beam is shaped by using shutters, a gobo, or an iris. The shaped beam shall then be focused by a system of lenses
 - 2.16.1 Manufacturers provide products by one of the following
 - 2.16.1.1 Altman Lighting Co. Inc. PHX 3 Profile Series
 - 2.16.1.2 Elation Professional Lighting, Inc. Colour 5 Profile Series
 - 2.16.1.3 Electronic Theatre Controls, Inc.- ColorSource Spot Series
 - 2.16.1.4 Or approved equal

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- 2.16.2 All Lighting Instruments
 - 2.16.2.1 Lamp: LED
 - 2.16.2.2 Pattern Holders: One for each fixture, with framing shutters.
 - 2.16.2.3 Color Frame: Black.

- 2.17 Color mixing Light Emitting Diode Wash Fixture: Luminaires shall be a RGBL color-mixing high-intensity LED illuminator with DMX control of intensity and color. The shaped beam shall then be focused by a system of lenses
 - 2.17.1 Manufacturers: provide products by one of the following:
 - 2.17.1.1 Altman Lighting Co. Inc. – AP Par Series
 - 2.17.1.2 Elation Professional Lighting, Inc.- SIXPAR 200 Series
 - 2.17.1.3 Electronic Theatre Controls, Inc.- ColorSource PAR Series
 - 2.17.1.4 Or approved equal
 - 2.17.2 All Lighting instruments
 - 2.17.2.1 Lamp: LED
 - 2.17.2.2 Spread Lenses: Three for each fixture, Medium Round, Medium Oval, Wide Round, with Black Frame
 - 2.17.2.3 Accessory Frame: Black

- 2.18 Color mixing Light Emitting Diode Cyclorama Fixture: Fixture shall be a RGBLI color-mixing high-intensity LED illuminator with DMX control of intensity and color that is suitable for lighting cycloramas from above
 - 2.18.1 Manufacturers: provide products by one of the following:
 - 2.18.1.1 Altman Lighting Co. Inc. – Spectra CYC Series
 - 2.18.1.2 Elation Professional Lighting, Inc. – KL Panel Series
 - 2.18.1.3 Electronic Theatre Controls, Inc – ColorSource CYC Series
 - 2.18.1.4 Or approved equal
 - 2.18.2 Tag: CL-1
 - 2.18.2.1 Lamp: LED
 - 2.18.3 Housing: Aluminum flat black color

- 2.19 Moving Lights

- 2.19.1 Manufacturers: provide products by one of the following:
 - 2.19.1.1 Elation Professional Lighting, Inc. – FUZE SPOT Series
 - 2.19.1.2 Electronic Theatre Controls, Inc. – RELEVE SPOT Series
 - 2.19.1.3 High End Systems, Inc. – SOLAFRAME 750 Series
 - 2.19.1.4 Or approved equal
- 2.19.2 Tag: ML-1
 - 2.19.2.1 General: 100-W, 120-V, LED, motorized remote-controlled lighting instrument; NRTL listed
 - 2.19.2.2 Optics: Zoom optics with continuously variable field angle from 18.5 to 42 degrees, programmable over a timed range of 2 seconds to 20 minutes; with a mechanical iris for beam-size control. Variable beam focus to soften the edges of gobos and light beams. Zoom combined with iris can project a beam with a field angle of 8 degrees
 - 2.19.2.3 Dimming: LED system shall use 15-bit nonlinear scaling techniques for high-resolution dimming that shall be optimized for smooth dimming over long fade times
 - 2.19.2.4 Strobe for strobe lighting effects
 - 2.19.2.5 Gobo: One rotating wheel with five rotatable wheel positions and one open position. One fixed gobo wheel with 11 pattern positions and one open position
 - 2.19.2.6 Beam Orientation Control: Smooth pan and tilt using a three-phase stepper motor system. Pan, 540 degrees; tilt, 270 degrees at 0.3-degree repeatability on either axis
 - 2.19.2.7 Control: ANSI E1.11 (USITT DMX512-A) protocol using five pin connectors

DISTRIBUTION COMPONENTS

- 2.20 Manufacturers: Subject to compliance with requirements, provide products by one of the following
 - 2.20.1 Electronic Theatre Controls, Inc
 - 2.20.2 Performance Electric
 - 2.20.3 SSRC
 - 2.20.4 Or approved equal
- 2.21 Connector Strip: Listed and labeled by an NRTL; factory-wired wireway and receptacle assembly

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- 2.21.1 Wireway: Steel or extruded aluminum, with removable cover and nominal cross-section dimensions of 3 by 4-1/2 inches
- 2.21.2 Accessories: Support cradles, and cable strain relief grips for each cable
- 2.21.3 Receptacles: Pluggable power and data inputs shall be fed by a single multi-conductor cable and single DMX or Ethernet cable
- 2.21.4 Receptacle Wiring: For connecting to terminal blocks; with 125 deg C, crosslinked, PE-insulated, identification-labeled wire
- 2.21.5 Terminal Blocks: Molded-barrier type with screw lugs to suit supply conductors
- 2.21.6 Mounting Hardware: Furnished with each unit; permits surface, single-pipe-bracket, or double-pipe-bracket mounting
- 2.21.7 Finish: Semigloss or matte black
- 2.22 Plug-in Boxes: Listed and labeled by an NRTL; factory-wired wireway and receptacle assembly, 24 inches long unless otherwise indicated; with the following features
 - 2.22.1 Wireway: Steel or extruded aluminum, with removable cover and nominal cross-section dimensions of 3 by 4-1/2 inches
 - 2.22.2 Accessories: Cable clamps, support cradles, and cable strain relief grips for each cable
 - 2.22.3 Receptacles: Pigtail mounted, 18 inches long, with strain relief at wireway wall penetration
 - 2.22.4 Receptacles: Pluggable power and data inputs shall be fed by a single multi-conductor cable and single DMX or Ethernet cable
 - 2.22.5 Receptacles: Flush mounted in wireway cover.
 - 2.22.6 Receptacle Wiring: For connecting to terminal blocks; with 125 deg C, crosslinked, PE-insulated, identification-labeled wire.
 - 2.22.7 Terminal Blocks: Molded-barrier type with screw lugs to suit supply conductors.
 - 2.22.8 Surface or Grid Mounting: With accessories for surface mounting or with pipe-mounting accessory bracket.
 - 2.22.9 Recessed Mounting: With flanged cover suitable for recessed mounting in wall.
 - 2.22.10 Finish: Semigloss or matte black.
- 2.23 Gridiron Junction Boxes: Listed and labeled by an NRTL; factory wired with terminal strips and concentric knockouts on all sides
 - 2.23.1 Terminal Blocks: Molded-barrier type with screw lugs to suit supply conductors

- 2.23.2 Accessories: Cable clamps, support cradles, and cable strain relief grips for each cable; and brackets for surface or pipe mounting
- 2.23.3 Finish: Semigloss or matte black
- 2.24 Floor Pockets: Listed and labeled by an NRTL; flush-mounted, receptacle outlet assembly
 - 2.24.1 Box: 0.0598-inch steel sheet, 10 inches deep
 - 2.24.2 Cover Plate: Steel, cast iron, or cast aluminum with nonskid safety tread surface and self-closing, hinged door with cable notches
 - 2.24.3 Barrier for allowing installation of control-voltage control receptacle for console input or handheld remotes

WIRE AND CABLE

- 2.25 Building Wire in Raceways: Comply with requirements specified in Section 26 05 19
- 2.26 Portable Power Cable: Listed and labeled by an NRTL; flexible stage and lighting power cable; Type SC, SCE, or SCT; 600 V; multiconductor; 60 deg C temperature rating

ETHERNET CABLING

- 2.27 For 10/100BaseT, comply with provisions for UTP cable and hardware
- 2.28 For 10Base-FL, comply with provisions for 62.5/125-micrometer, multimode, optical-fiber cable and hardware

ANSI E1.11 (USITT DMX512-A) CONTROL CABLING

- 2.29 Standard Cable: NFPA 70, Type CM
- 2.30 Paired, low-capacitance computer cable for ANSI E1.11 (USITT DMX512-A) applications. Two pairs, twisted, No. 22 AWG, stranded, tinned-copper conductors
 - 2.30.1 PE insulation.
 - 2.30.2 Inner Shield: 100 percent coverage, aluminum foil-polyester tape.
 - 2.30.3 Outer Shield: 90 percent coverage, tinned-copper braid.
 - 2.30.4 Outer Shield Drain Wire: Stranded, tinned copper.
 - 2.30.5 PVC jacket.
 - 2.30.6 Flame Resistance: Comply with UL 1581.
- 2.31 Plenum-Rated Cable: NFPA 70, Type CMP.
 - 2.31.1 Paired, low-capacitance computer cable for ANSI E1.11 (USITT DMX512- A) applications. Two pairs, twisted, No. 22 AWG, stranded, tinned-copper conductors

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- 2.31.2 Insulation: Foam fluoridated ethylene propylene
- 2.31.3 Inner Shield: 100 percent coverage, aluminum foil-polyester tape
- 2.31.4 Outer Shield: 90 percent coverage, tinned-copper braid
- 2.31.5 Outer Shield Drain Wire: Stranded, tinned copper
- 2.31.6 Low-smoke PVC jacket
- 2.31.7 Flame Resistance: Comply with NFPA 262
- 2.32 Control Voltage Control Cabling:
 - 2.32.1 Class 1 Control Circuits: Stranded copper, Type THHN-THWN, in raceway; complying with UL 83
 - 2.32.2 Class 1 Control Circuits: Stranded copper, Type THHN, in raceway complying with UL 44
 - 2.32.3 Class 2 Control Circuits: Stranded copper, Type THHN-THWN, in raceway; complying with UL 83
 - 2.32.4 Class 2 Control Circuits: Stranded copper, Type THHN, in raceway; complying with UL 44
 - 2.32.5 Class 3 Remote-Control and Signal Circuits: Stranded copper, Type TW or Type TF; complying with UL 83
- 2.33 Paired Cable: NFPA 70, Type CMG
 - 2.33.1 One pair, twisted, No. 16 AWG, stranded, tinned-copper conductors
 - 2.33.2 PVC insulation
 - 2.33.3 Unshielded
 - 2.33.4 PVC jacket
 - 2.33.5 Flame Resistance: Comply with UL 1581
- 2.34 Plenum-Rated, Paired Cable: NFPA 70, Type CMP.
 - 2.34.1 One pair, twisted, No. 16 AWG, stranded (19x29), tinned-copper conductors
 - 2.34.2 PVC insulation.
 - 2.34.3 Unshielded
 - 2.34.4 .PVC jacket.
 - 2.34.5 Flame Resistance: Comply with NFPA 262.

- 2.35 Paired Cable: NFPA 70, Type CMG.
 - 2.35.1 One pair, twisted, No. 18 AWG, stranded (19x30), tinned-copper conductors
 - 2.35.2 PVC insulation.
 - 2.35.3 Unshielded.
 - 2.35.4 PVC jacket.
 - 2.35.5 Flame Resistance: Comply with UL 1581.
- 2.36 Plenum-Rated, Paired Cable: NFPA 70, Type CMP.
 - 2.36.1 One pair, twisted, No. 18 AWG, stranded (19x30), tinned-copper conductors
 - 2.36.2 Fluorinated ethylene propylene insulation.
 - 2.36.3 Unshielded
 - 2.36.4 Plastic jacket
 - 2.36.5 Flame Resistance. Comply with NFPA 262

LIGHTING CONTROL SYSTEM

- 2.37 Manufacturers: Subject to compliance with requirements, provide products by one of the following
 - 2.37.1 Electronic Theatre Controls, Inc.
 - 2.37.2 Entertainment Technology.
 - 2.37.3 Strand Lighting.
 - 2.37.4 Or approved equal.
- 2.38 Description: Microprocessor-based modular system consisting of dimmer and control modules operated from remote-control stations and a control console
 - 2.38.1 Comply with UL 508.
 - 2.38.2 Comply with ANSI E1.11 (USITT DMX512-A)
- 2.39 Dimmer Racks: Listed and labeled by an NRTL; dead-front, front-access, freestanding rack for mounting modular dimmers; formed-steel or extruded-aluminum structural members; completely enclosed with steel or aluminum panels. Painted with manufacturer's standard corrosion-resistant primer and finish coats, and having the following features
 - 2.39.1 Primary Circuit Breaker: Fault-current withstand rating of the rack; not less than 10,000 A, symmetrical
 - 2.39.2 Hinged, locking front door, with openings to allow air intake across the face of all dimmer modules

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- 2.39.3 Individual rack sections shall not exceed 84 inches high by 25 inches deep by 30 inches wide. Multi-section racks shall be interconnected with busbars
- 2.39.4 For each module position, provide support rails and control-pin configurations, constructed for precise alignment of dimmer modules into power and signal connector sockets, with keyed connections for power capacity restrictions
- 2.39.5 Forced-air cooling of each rack for maintaining operating temperature at each dimmer, assuming full load, in ambient temperature not to exceed 40 deg C. Exhaust rates shall be variable, using temperature sensors and fan-speed control electronics. Individual control of multiple fans is acceptable in lieu of fan-speed control. Fan(s) shall start and stop automatically. Fan noise at full load shall be less than 3.1 sones
- 2.39.6 Each rack shall have an automatic air-temperature sensor to shut off all dimmers in the rack, should the internal temperature rise above maximum safe operating limits. In an overheat condition, the fan shall continue operating. When a safe operating temperature is restored, the system shall automatically reset to allow normal user control
- 2.40 Dimmers: Modular solid-state units that operate smoothly over their operating ranges without audible lamp noise or radio-frequency interference at any setting. Modules shall be dead-front, draw-out type with floating line, load, and control sockets for smooth insertion and withdrawal; with load-side thermal-magnetic circuit breaker, speed-controlled cooling fan, and overtemperature sensor
 - 2.40.1 Non-Dim Units: On-off relay control only. Capable of serving inductive loads, such as motors or HID luminaires
 - 2.40.2 Surge Protection: Modules shall withstand power-line surges of 6000 V/3000 A according to IEEE C62.41.1 and IEEE C62.41.2
 - 2.40.3 Filter each dimmed circuit to provide a minimum 350-mic.sec., current-rise time at a 90-degree conduction angle at 50 percent of rated dimmer capacity. At any load within rating, rate of current rise shall not exceed 30 mA/mic.sec., measured from 10 to 90 percent of load current waveform
- 2.41 Intelligent Breaker System: Panels to be listed by UL508, UL67, and UL924 and shall be labeled. Breakers shall be UL489 listed. Panels shall consist of a main enclosure with 12, 24, or 48 pole breaker subpanels, integral control electronics for low voltage terminations and provision for accessory cards. Panel shall be capable of switching 6 poles on or off at once, or in a user-selectable delay per breaker using a period of 0.1 to 60 seconds in 0.1 second increments. Panel shall receive ESTA DMX512-A control protocol
- 2.42 Control System: Microprocessor-based control system, A.NSI E1.11 (USITT DMX.512-A) protocol, with a nonvolatile system memory to adjust dimmer channel settings for different scenes, to patch dimmers to channels, and to manually or automatically change dimmer settings from one preset scene to another
 - 2.42.1 Control shall support Ethernet-based LAN at devices
 - 2.42.2 Provide means to create and monitor show data on a PC using software by console manufacturer. Software shall be capable of the following

- 2.42.2.1 Creating show and providing for use of show files
 - 2.42.2.2 Playing back show in a console-simulation mode
 - 2.42.2.3 Accessing all remote-control stations associated with the console and control system
 - 2.42.2.4 Providing standard Ethernet connection between the console control system and the lighting system components
- 2.43 Display the following system status information on a color, 24-inch LCD monitor associated with the control console
- 2.43.1 Current channel intensities
 - 2.43.2 Cue information
 - 2.43.3 Monitor
- 2.44 Moving Lights: Include a standard control library, a program patch specific to luminaire(s) provided, and selective programming with ANSI E1-11 (USITT DMX512-A) addressing of fade, focus points, beam, image, color, and position
- 2.45 Control Console: Tabletop unit with manual and computer-based programming controls, memory units, indicating devices, and the following features
- 2.45.1 Grand-master level control.
 - 2.45.2 Blackout switch.
 - 2.45.3 Multiple submaster level controls with overlapping pile-on performance.
 - 2.45.4 Bump buttons for momentary control of channels or submasters, one for each submaster level control.
 - 2.45.5 Two cross-fade controls for split dipless fade between scenes, each with its own fade progress indicator
 - 2.45.6 One set of scene level controls for each scene when used in two-scene preset mode. Second set of scene level controls to allow setting levels into memory for expanded single scenes when used in multiple single-channel scene mode. Each set shall have same quantity of scene level controls as is used for submaster level controls
 - 2.45.7 Multibutton keypad for programming in multiscene memory mode.
 - 2.45.8 Fade time control for assigning fade time to cues, with individual cue adjustment from one second to five minutes, minimum
 - 2.45.9 Digital display, for operating menus and memory readout
 - 2.45.10 Controls for setting levels into memory
 - 2.45.11 Cord and connector for connecting console to outlets for console power and control

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- 2.46 System Operation: Selectable between multichannel two-scene preset and automatic sequential execution of programmed cues mode. Console features include electronic patching of control signals for up to 512 dimmers and off-line data storage using USB drive port
 - 2.46.1 Operational capability includes the following
 - 2.46.1.1 Live and blind programming.
 - 2.46.1.2 Special effects programmability for automatic operation of lights in pulsating, sequential dimming and brightening, and other special operating modes. Special effects menu displays operator guidance for programming and individual step levels
 - 2.46.1.3 Inserting cues between designated cues without renumbering
 - 2.46.1.4 Out-of-sequence playback of cues
 - 2.46.1.5 Controlling houselights and stage lights from console by assigning their dimmers or non-dim on-off controls to a channel
 - 2.46.1.6 Retaining programmed cues in memory for minimum of one year after power outage
 - 2.46.1.7 Automatic sequential execution of programmed cues
 - 2.46.1.8 Printing cues using parallel or serial printer port, cable, and printer. Cable and printer are not included with this system
- 2.47 Console Power and Control Outlets: Multiple receptacles matched to connector on console connector cord
- 2.48 House Lighting Control Station: Architectural-type, multichannel, remote-dimmer- control touchscreen station with the following features
 - 2.48.1 System controls designated houselights, stage lights, and other lights
 - 2.48.2 Stage lighting controls compatible with dimming and control system.
 - 2.48.3 Flush wall mounted unless otherwise indicated
 - 2.48.4 Shall support default and fully graphical control pages
 - 2.48.5 Shall be designed to allow control of lighting and associated systems via Touchscreen controls. System shall allow the control of presets, sequences, macros and time clock events
 - 2.48.6 Master page that controls lights on all channels proportionally from completely dimmed to degree of brightness that corresponds to individual slider positions
 - 2.48.7 Page that includes a fully on switch that turns all channels on at full brightness regardless of other page's intensities

- 2.48.8 Page that includes a fully on switch that turns all channels on at full brightness regardless of other page's intensities
- 2.48.9 Take-control/off switch that places station in control of channels and sets lighting to levels dictated by channel and master-page controls
- 2.48.10 Legend on face of wall plate that identifies items as "House Lighting Control Station" and identifies functions
- 2.49 Entry Station: Push button activates or deactivates indicating light and presets scene of house lighting control system
 - 2.49.1 LED indicating light illuminates when preset command is executed
 - 2.49.2 Labeled "Entry"
 - 2.49.3 Flush wall mounted unless otherwise indicated
- 2.50 Key-Entry Station: Key-operated switch controls station to activate or deactivate indicating light and presets scene of lighting control system
 - 2.50.1 LED indicating light illuminates when preset command is executed
 - 2.50.2 Labeled "Entry"
 - 2.50.3 Flush wall mounted unless otherwise indicated
- 2.51 Fire Alarm System Override: The lighting controls system shall be capable of overriding any preset house lighting setting upon receipt of a fire alarm signal and restoring house lighting levels to 100 percent
- 2.52 Flush wall mounted unless otherwise indicated

RIGGING COMPONENTS

- 2.53 Manufacturers: Subject to compliance with requirements, provide products by one of the following
 - 2.53.1 Altman Lighting Co. Inc.
 - 2.53.2 Electronic Theatre Controls, Inc.
 - 2.53.3 SSRC.
 - 2.53.4 Or approved equal.
- 2.54 Pipe Clamps: Malleable iron, suitable for clamping luminaires or items to pipe from 3/4 to 2 inches in OD. Arranged for horizontal rotation of yoke for aiming; equipped with T- bolt to lock alignment

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- 2.55 Safety Cables: Heavy-duty, flexible steel; 30-inch nominal length, with spring clip at one end and steel ring at the other end
- 2.56 Cable Grips: Stainless steel; basket-weave type for supporting stage cables

PART 3 - EXECUTION

- 3.1 Set permanently mounted items level, plumb, and square with ceilings and walls.
 - 3.2 Indicated mounting heights are to bottom of unit for suspended items and to center of unit for wall-mounted items
 - 3.3 Mount and connect luminaires, and install and connect distribution devices
 - 3.3.1 If arrangement is not indicated, install so each luminaire, dimmer, house lighting circuit, control channel, and outlet circuit can be operated, and complete system demonstrated, in all operating modes
 - 3.3.2 Install safety cables secured to stage rigging or gridiron for all pipe-mounted electrical luminaires and equipment
 - 2.5 Dimmer Rack Mounting: All equipment or enclosures shall be anchored to the structure. The Contractor shall submit drawings signed by the Contractor's registered Structural Engineer indicating method of compliance prior to installation.
- 3.1 WIRING
- 3.5 Power Wiring
 - 3.5.1 Install wiring as specified in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables" for hardwired connections. Install wiring in raceways except cable and plug connections. Install cable strain relief device on power and control cable drops
 - 3.5.2 Install power wiring with a separate neutral for each output circuit from main dimmer and for each house and stage lighting circuit
 - 3.6 Signaling, Remote-Control, and Power-Limited Circuits
 - 3.6.1 Size conductors according to lighting control device manufacturer's written instructions
 - 3.6.2 Select cable insulation, shielding, drain wire, and jacket complying with lighting control device manufacturer's written instructions
 - 3.6.3 Install circuits to eliminate RFI and electromagnetic interference
 - 3.6.4 Install wiring in raceways except cable and plug connections
 - 3.6.5 Remote-control circuits associated with emergency lighting control shall be installed complying with Class 1 circuit standards in NFPA 70

- 3.7 Wiring within Enclosures: Bundle, lace, and train conductors to terminal points.
- 3.8 Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes and in terminal cabinets and equipment enclosures
- 3.9 Remove wall plates and protect devices and assemblies during painting
- 3.10 Support luminaires, distribution components, and accessories as required. Equip all pipe-mounted equipment with safety cables that are secured to supporting pipe
- 3.11 Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems"

IDENTIFICATION

- 3.12 Identify components and power and control wiring according to Section 26 01 00 "Identification for Electrical Systems"
- 3.13 Label each luminaire, lighting outlet, distribution device, and dimmer module with unique designation. Labels on elevated components shall be readable from the floor

FIELD QUALITY CONTROL

- 3.14 Manufacturer's Field Service: Engage a factory-authorized service representative to test, inspect, and adjust components, assemblies, and equipment installations, including connections
- 3.15 Perform the following tests and inspections with the assistance of a factory-authorized service representative
 - 3.15.1 Schedule visual and mechanical inspections and electrical tests with at least seven days' advance notice
 - 3.15.2 Inspect each luminaire, outlet, module, control, and device for defects, finish failure, corrosion, physical damage, labeling by an NRTL, and nameplate
 - 3.15.3 Exercise and perform operational tests on mechanical parts and operable devices according to manufacturer's written instructions
 - 3.15.4 Check tightness of electrical connections with torque wrench
 - 3.15.5 Verify proper protective device settings, fuse types, and ratings
 - 3.15.6 Record results of tests and inspections
- 3.16 Electrical Tests: Perform tests according to manufacturer's written instructions
 - 3.16.1 Continuity tests of circuits
 - 3.16.2 Operational Tests: Connect each outlet to a luminaire and a dimmer output circuit, so each dimmer module, dimmer-control and output circuit, outlet, and luminaire in a typical operating mode will be sequentially tested. Set and operate controls to demonstrate luminaires, outlets, dimmers, and controls in a sequence that cues and reproduces actual operating functions for a typical system of the size and scope installed. Include operation and control of houselights and stage

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lights from each control location and station, including optional plug-in, control-console outlet locations. Record luminaire and outlet assignments, control settings, operations, cues, and observations of performance

- 3.17 Stage lighting will be considered defective if it does not pass tests and inspection

Prepare test and inspection reports

- 3.18 Prepare a schedule of lighting outlets by number; indicate circuits, dimmers, connected luminaires, and control-channel assignments. Prepare a schedule of control settings and circuit assignments for house control channels. Prepare written reports of tests and observations. Report defective materials, workmanship, and unsatisfactory test results. Include records of repairs and adjustments made

ADJUSTING

- 3.19 Occupancy Adjustments: Provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose

- 3.20 Modify the software programming as required to comply with the Contract Documents

DEMONSTRATION

- 3.21 Engage a factory-authorized service representative to train District's staff to adjust, operate, and maintain stage lighting equipment

3.21.1 Training shall be one four-hour session or as agreed by District and manufacture

3.21.2 Include associated training cost with the equipment installation

3.21.3 Provide a 14-day notice to District prior to scheduling training period

CLOSEOUT SUBMITTALS

- 3.22 Operation and Maintenance Data: For luminaires, distribution components, software operating manuals, and controls to include in emergency, operation, and maintenance manuals. Include the following:

3.22.1 Control-Console Introduction

3.22.1.1 Descriptions of controls and features.

3.22.1.2 Software instruction manuals.

3.22.1.3 Setup requirements for unit and related equipment.

3.22.1.4 Default settings.

3.22.1.5 Maintenance procedures and schedules

3.22.2 Control Console Operation

3.22.2.1 Elementary on-off operation

- 3.22.2.2 How to set cues manually.
 - 3.22.2.3 How to patch dimmer to channels electronically.
 - 3.22.2.4 How to operate presets manually.
 - 3.22.2.5 How to operate fundamental memory.
 - 3.22.2.6 How to set and record simple cues.
 - 3.22.2.7 How to recall, play back, and revise cues and scenes.
 - 3.22.2.8 How to use submasters, groups, focus points, fader channels; and how to split cues, store and recall programs, set up special effects, and print out cues
 - 3.22.2.9 How to set up and run system for a typical event or performance.
 - 3.22.2.10 How to get help
- 3.22.3 Dimming/Relay Racks
- 3.22.3.1 Descriptions of features, functions, and safety and security precautions
 - 3.22.3.2 Descriptions of dimming module features, software-driven functions, non-dim functions, and associated racking systems
 - 3.22.3.3 How to compare connected loads against dimmer capacity ratings
 - 3.22.3.4 How to terminate basic power-in and power-out connections
 - 3.22.3.5 Basic maintenance requirements, including need for qualified electrician for internal maintenance; basic maintenance schedule; techniques for keeping terminals properly tightened, filter screens clean, and overheat sensors checked; and techniques for performing other required servicing
 - 3.22.3.6 How to adjust dimmer-control module
 - 3.22.3.7 How to get help
 - 3.22.3.8 Description of warranty
- 3.22.4 System Troubleshooting: Procedures for handling problems with common software, programming, control console, dimmer rack, and distribution system; include information on how to get help
- Software and Firmware Operational Documentation
- 3.22.5 Software operating and upgrade manuals
 - 3.22.6 Program Software Backup: On USB drive or compact disk, complete with data files

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3.22.7 Device address list if applicable

3.22.8 Printout of software application and graphic screens

END OF SECTION

SECTION 26 90 90

ELECTRICAL CLOSEOUT

PART 1 – GENERAL

- 1.1 Upon completion of the electrical work, the entire installation shall be tested by the Contractor, and demonstrated to be operating satisfactorily to the Architect, Engineer, Inspector and Owner.
- 1.2 All testing and corrections shall be made prior to demonstration of operation to the Architect, Engineer, Inspector and Owner.
- 1.3 In addition to the demonstration of operation, the Contractor is also required to review the content and quality of instructions provided on items demonstrated with the Architect, Engineer, Inspector and Owner.

PART 2 – EXECUTION

- 2.1 Wiring shall be tested for continuity, short circuits and/or accidental grounds. All systems shall be entirely free from “grounds,” “short circuits,” and any or all defects.
- 2.2 Motors shall be operating in proper rotations, and control devices functioning properly. Check all motor controllers to determine that properly sized overload devices are installed, and all other electrical equipment for proper operation.
- 2.3 Tests and adjustments shall be made prior to acceptance of the electrical installation by the Architect, and a certificate of inspection and acceptance of the electrical installation by local inspection authorities shall be provided.
- 2.4 All equipment or wiring provided which tests prove to be defective or operating improperly shall be corrected or replaced promptly, at no additional cost to the Owner.
- 2.5 Test all motor and feeder circuits with a “megger” tester to determine that insulation values conform to Section 110-20, California Electrical Code (CEC). Test reports must be submitted and approved by the engineer before final acceptance.
- 2.6 Test all grounding electrode connections to assure a resistance of no more than 10 ohms is achieved. Augment grounding until the ohmic value stated above is achieved. Provide certified test results to the Architect, Engineer and Inspector.

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 subcontract 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 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.
- 1.4.5 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.
- 1.4.6 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.
- 1.4.7 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.

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- 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 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.

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- 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 All equipment racks and enclosures for the Voice/Data/IP-Page Infrastructure are existing for this project. Provide additional components as shown in the drawings and in these specifications.

MDF Room Requirements

- 2.2 The Main Distribution Frame (MDF) Room is existing in Building “A”.
- 2.3 Only additional components for the IP-Based Paging System are required to be provided in the MDF Room. All other systems components are existing.

IDF Location Requirements

- 2.4 The Intermediate Distribution Frame (IDF) Rooms are existing in Buildings “B” (MPR Building) and “Room P-5”. Provide additional components as shown in the drawings and in these specifications.

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- 2.5 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 IDF - 'MPR' – Building “B” – Shall serve as the IDF location for all new Category-6 cabling installed for the existing MPR Building and for the New Kitchen Service Building. Route all cabling to the existing IDF location in the existing Electrical Closet.
- 2.6.1 The existing IDF location does not have an existing equipment rack or cabinet. The existing data cabling is plugged directly into the network switch. The existing switches are sitting on a wall mounted shelf and are not secured to the shelf. All new Category-6 UTP cabling will be installed per EIA/TIA Standards. Direct termination of the cables with RJ45 plugs will not be accepted and voids the warranty provided by the Infrastructure System manufacturer. All new cables shall be terminated on a Category-6 patch panel. Provide patch cables to the existing or new network switches provided by the District. New outlets shall be provided at the device location, as shown in the specifications. Patch data ports to the network switches as directed by the District IT Department.
- 2.6.2 All voice/data infrastructure cabling shall be routed to the existing IDF location. All speaker cabling for the analog page speakers in the MPR Room THAT ARE NOT IP-BASED shall be routed to the other side of the room to the existing 66-type punch blocks for the existing analog Intercom System connections. Provide a new terminal strips on the backboard for the new speaker cables and cross connect to the existing page zones on the existing punch bocks. Confirm zones with the District Facilities Department. New IP-Based Paging Speakers shall be rioted to the IDF location.
- 2.7 IDF - 'Room P-5' – Building “#3” on Site Plan – Shall serve as the IDF location for all new Category-6 cabling installed for the New Classroom Relocatable Building #8 (as shown on the Site Plan).
- 2.7.1 Route all new cabling to the existing IDF location in 'Room P-5' (Building “#3” on Site Plan). All voice/data infrastructure cabling shall be routed to the existing IDF location. The existing IDF Cabinet currently houses the existing network switches and UTP patch panel. Use the existing UTP Patch Panel's unused ports for the to terminate the new cabling. Provide an additional Category-6 patch panel only if there is insufficient open ports on the existing patch panel. All cabling shall be neatly routed within the IDF Cabinet.
- 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.
- 2.8.1 IDF - 'MPR' – Building “B” – Provide new Category-6 patch panel for the additional Category-6 UTP Voice/Data/IP-Page device outlet cabling in the existing IDF location. The patch panel shall be wall mounted on a hinged wall mount bracket directly below the existing Communications Backboard and next to the existing wall mounted shelf that the existing network switches are placed on. The cables shall be routed to the patch panel location and terminated on the new patch panel. Label all cabling per the project detail drawings and specification requirements. Provide wall mount bracket by Leviton Model #49251-W62 (or approved equal by one of the Approved Manufacturers)

- 2.8.2 IDF - 'Room P-5' – Building “#3” on Site Plan – The IDF Cabinet is existing in Room P-5. The existing data patch panel shall be used to terminate the additional Category-6 UTP Voice/Data/IP-Page device outlet cabling installed for the New Relocatable Classroom Building #8 (as shown on the Site plan). Provide a new Category-6 patch panel as required for additional port requirements. Contractor to field verify the number of available ports on the existing patch panel. The cables shall be routed to the patch panel location and terminated on the existing patch panel. Label all cabling per the project detail drawings and specification requirements.

Copper Patch Cords

- 2.9 Copper patch cords shall be furnished and installed by the Contractor.
- 2.10 Provide Category-6 (Patch Panel End) patch cords with pre-molded boot, provide quantity equal to:
- 2.10.1 Provide 100% of the total Category-6 cable ports provided on the patch panels.
- 2.10.2 All patch cords to be installed by Contractor. Provide 100% of total copper patch cords required to be (4) feet in length.
- 2.11 Provide Category-6 (Workstation End) patch cords with pre-molded boot provide quantity equal to:
- 2.11.1 Provide 100% of the total Category-6 cable ports provided on the patch panels.
- 2.11.2 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.
- 2.11.3 Patch cords installed at WAP (Wireless Access Point) locations, IP Camera and IP Intercom locations shall be (2) feet in length.
- 2.12 Requirements for all copper patch cords furnished:
- 2.12.1 Color of patch cords shall be determined by the color code shown in detail drawings.
- 2.12.2 Patch cords shall as manufactured by Leviton, Commscope or Ortronics based on the network infrastructure system furnished by the Contractor.
- 2.12.3 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.
- 2.12.4 Provide all other items as detailed on the drawings.

Category-6 Station Cable

- 2.13 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.

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- 2.14 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.
- 2.15 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.
- 2.16 The cable shall be UL or ETL rated and UL verified in compliance Category-6 EIA/TIA standards. Approved cables for Network Infrastructure System:
- 2.16.1 Commscope (Uniprise) – CS37R
 - 2.16.2 Superior Essex – NextGain Cat 6eX - #54-246-xA
 - 2.16.3 Berk-Tek – LANMARK 2000 – 10167477
- 2.17 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)
- 2.18 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

- 2.19 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.
- 2.20 Provide Category-6 insert installation kits for all locations furnished with Category-6 UTP cabling.
- 2.21 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.
- 2.22 Provide the following Category-6 UTP data connector per Network infrastructure warranty requirements:
- 2.22.1 Leviton eXtreme Cat6+ Quick Port Series 61110-R
 - 2.22.2 Uniprise (Commscope) UNJ 600 Series UNJ600
 - 2.22.3 Ortronics Clarity 6 Tracjack Series OR-TJ600

Outlet Faceplates

- 2.23 Provide a two-port faceplate for all one and two-port outlet locations. Provide blanks for all unused openings.
- 2.24 Provide a four-port faceplate for all three and four port outlet locations. Provide blanks for all unused openings.
- 2.25 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.
- 2.26 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.
- 2.27 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.
- 2.28 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.
- 2.29 All faceplates and surface mount outlet boxes shall be furnished with label windows. All labeling shall be installed within the label window.
- 2.30 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.
- 2.31 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.
- 2.32 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.
- 2.33 Reference the drawings for special outlet configurations or plate requirements.

PART 3 – IP PAGE SPEAKER/CLOCK REQUIREMENTS

- 3.1 The Contractor shall furnish and install all IP-based speakers, horns, combination IP Speaker/Clock and 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

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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.
- 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 surface mounted IP-Speaker/Clock Combination with microphone, Atlas/IED Part #IP-SDM - provide surface mount angled enclosure Part #IP-SEA-SD. Combination clock/speaker locations shown on the floor plans shall be provided with this device.
 - 3.6.2 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.
 - 3.6.3 Interior POE+ recessed IP-Based Speaker with microphone, Atlas/IED Part #IP-SM - provide recessed flush straight speaker enclosure Part #IP-FEST-SD.
 - 3.6.3.1 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.
 - 3.6.4 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.
 - 3.6.4.1 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.
 - 3.6.5 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.

- 3.6.6 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.
- 3.6.7 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.
- 3.6.8 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.
- 3.6.9 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 Cisco VoIP Call Manager 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

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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 'A' 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 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 in

the accessible ceiling 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-

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laminating 1.2" by 1.5" wrap around label Part #29689 (NO ACCEPABLE 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 ACCEPABLE 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 ACCEPABLE 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.
- 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 #WMX 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.

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- 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-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

- 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.

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- 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 (2019 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-Builts 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.

END OF SECTION

SECTION 272000

INTEGRATED AUDIO/VISUAL SYSTEM

PART 1 – GENERAL

SUMMARY

- 1.1 The Contractor shall furnish all labor, project management, materials, tools, equipment, and resources necessary for the installation, startup, and testing of the system shown on the plans and described in the specifications.
- 1.2 Related Specification Sections:
 - 1.2.1 Section 26 01 00 -General Provisions
 - 1.2.2 Section 26 05 33 -Conduit and Fitting
 - 1.2.3 Section 26 05 19 -Conductors
 - 1.2.4 Section 26 05 34 -Outlet and Junction Boxes
- 1.3 The Contractor shall furnish and install the system as defined by the plans and specifications. The Contractor must demonstrate to the Owner that the system is complete and complies with all operational requirements set forth in the plans and specifications.
- 1.4 The work covered under this section of the specifications consists of furnishing all labor, equipment, supplies and materials, and in performing all operations necessary for the turnkey and fully completed installation of an audio/ video system in accordance with the specifications and accompanying drawings, except as specifically noted otherwise.
- 1.5 Cables for the system shall be pulled through the conduit systems furnished by the building Contractor. The 27 20 00 Contractor shall be responsible for providing all cables required and for coordinating and supervising the cable installation. The 27 20 00 Contractor shall be responsible for ensuring the integrity of the cables before and after installation.
- 1.6 Work Excluded:
 - 1.6.1 Excluded from this work shall be any and all general construction services regarding masonry and general carpentry services. Those services are to be provided and installed by the general Contractor.
 - 1.6.2 Conduit/raceways, sleeves, cable trays, electrical boxes, hand holes, pullboxes, etc. required for the system shall be furnished and installed by the Electrical Contractor. The conduit/raceways and electrical boxes furnished and installed under Electrical Contractor shall conform with the requirements of the drawings and specifications for the system.
- 1.7 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; software; supplies; materials and training. The Contractor will perform all operations necessary for the "TURNKEY" and fully completed

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installation in accordance with the specifications herein. As such, the successful Contractor must be factory trained on all aspects of system hardware. The successful Contractor shall be a California licensed C7 or 10 premise wiring Contractor as defined in this specification. SubContractors may not be utilized in the implementation of the plant wiring installation.

- 1.8 Approval to bid shall not release the Contractor from full specification compliance requirements. Final system acceptance testing shall govern final system acceptance and compliance with the specifications.
- 1.9 Failure to provide a functional equivalent shall result in the removal of the alternate system at the Contractor's expense.
- 1.10 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.
- 1.11 Where the words 'provide' or 'provision' is 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.
- 1.12 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.

DEFINITIONS

- 1.13 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.
- 1.14 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'.
- 1.15 Finish Space: Any space ordinarily visible, including exterior areas.

Contractor Qualifications

- 1.16 The successful bidder shall be a California licensed C7 or C10 premise wiring Contractor as defined in this specification. Subcontractors may not be utilized in the implementation of the installation or programming.
- 1.17 The successful bidder shall have design staff with a minimum of the following certifications and shall include all certifications with their bid.
 - 1.17.1 (1) BICSI certified (RCDD) Registered Communications Distribution Designer.
 - 1.17.2 CTS Certification
 - 1.17.3 Extron XTP Systems Engineer

- 1.17.4 Extron TLP programming certifications
- 1.17.5 Extron Global Configuration Certification
- 1.18 The successful bidder shall have installation staff with a minimum of the following and shall include all certifications with their bid.
 - 1.18.1 CTS-I certification
 - 1.18.2 Extron Advanced A/V Certifications.
 - 1.18.3 Contractor must have a minimum of (8) full time certified installation technicians with Extron Certifications (include certifications with submittals)
- 1.19 All bidders must provide a listing of two similar size projects having the same scope of work using the proposed information delivery equipment. This listing shall be complete with facility names, completion dates, names of contacts, and their telephone numbers. Referenced projects must have been completed in the past 18 months.
- 1.20 The bidder shall have a factory trained service department. The service department shall be on call 24 hours a day, 365 days a year, to arrive and initiate onsite service the specified equipment upon (24) hours notice.
- 1.21 The Contractor shall employ factory-trained technical/service personnel for service and maintenance of the system. Their résumés will be required. The factory-trained technical/service personnel shall have a minimum of two years experience installing the proposed system. The Bidder shall submit the names and copies of the certificates issued by the factory. The bidder shall instruct the Owner's technical personnel in the operation, care, and maintenance of the system.

CODE COMPLIANCE

- 1.22 All material and equipment shall be clearly listed, labeled, or certified by Underwriters Laboratories, Inc. All power supplies and computers shall be clearly UL Listed. Any system which is not UL Listed at time of bid will be rejected.
- 1.23 All acceptable systems shall be approved under Part 15, Subpart B, Section 15.107b of the FCC Rules and Regulations. Bidders must provide the FCC Registration Number of the proposed system. Systems that are not in compliance with the FCC will not be considered. Any system that is not FCC compliant at time of bid will be rejected. All equipment must be clearly labeled with FCC compliance stickers.
- 1.24 The system shall be installed in accordance with local and national electrical codes.
- 1.25 The manufacturer and Contractor shall provide the Owner with a release for use of all copyright materials, corporate logos, and corporate trademarks at time of bid.

SUBMITTALS

- 1.26 General Submittal Requirements
 - 1.26.1 Phase I 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:

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- 1.26.2 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:
 - 1.26.3 Description and quantity of each product.
 - 1.26.4 Manufacturer's Name and Model Number.
 - 1.26.5 Manufacturer's Specification Sheet or Cut Sheet. Material Cut Sheets shall provide detailed product information and shall be original manufacturer product bulletins. Copies of material information from vendor websites shall not be considered equal and will not be excepted.
 - 1.26.6 Material Cut Sheet part number provided shall be highlighted or provided with an arrow directed at the corresponding part number.
 - 1.26.7 Specification Item Number referenced for each required product or if not shown in the specifications, Drawing Detail Number being referenced. (ie; Spec. 271000 Item 2.1 or DWG E4.15/#1)
 - 1.26.8 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.
- 1.27 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 in a CAD Software. Submission shall include electronic print copies to match the contract drawings, and Phase II submittals drawings shall include the following.
- 1.27.1 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.
 - 1.27.2 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.).
- 1.28 Common submittal mistakes which will result in submittals being rejected:
- 1.28.1 Not including the qualifications of the installing Contractor Company and Contractor's Staff.
 - 1.28.2 Not including all items listed in the above itemized description.
 - 1.28.3 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 (provided for the project) or crossing out the items which are not applicable.

- 1.28.4 Not including actual manufacturer's cut sheets or catalog information of proposed products.
 - 1.28.5 Do not provide website sales pages instead of Material Cut Sheets. Printing the entire web page with advertising and non-applicable items or information will not be acceptable.
 - 1.28.6 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" or "to be determined later" statements. The products being submitted must be the products installed.
- 1.29 Component Samples and Mock-ups
- 1.29.1 Provide one full size installation sample mock-up of a normal wall faceplate for approval. All samples are to be fully labeled per these specifications. Samples are to be delivered to the Construction Manager's office on site prior to installation.
 - 1.29.2 All sample mock-ups are intended to represent the components that are to be installed as part of this project. They are to be provided with all associated components and labeling necessary to make up a complete mock-up. Installation shall not proceed until the Owner's Representative has approved the samples. Once samples and other documents have been submitted and inspected by the Owners Representative approved, they shall be retained. Any installation that does not meet this standard shall be replaced or re-worked as approved by the Owners' Representative at no cost to the project.
- 1.30 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:
- 1.30.1 Clearly indicate Project Name and Client, Johnson Consulting Job Number (located in bottom left corner of JCE Engineering Stamp) and each drawing Sheet Number required (i.e., E1.1, E2.1, E4.1 etc.).
 - 1.30.2 Identify the name, Company, Title, phone number, mailing address and e-mail address of the person to receive the files.
 - 1.30.3 Detail or Riser diagram sheets, System Schematic drawings or any other drawings other than floor plans or site plans, will not be made available to the Contractor.
 - 1.30.4 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.
- 1.31 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.
- 1.32 Contractor shall be responsible for the complete provision and installation of all components as specified herein. The Contractor shall provide all tools, equipment, fixtures, appliances, ancillary piece parts and hardware as necessary to complete the assembly and installation as requested. The Owner's Representative may conduct

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scheduled or unscheduled inspections of the Contractor's work at any time during construction. All work included in the scope assigned to the Contractor that is associated with this project shall be accomplished in a workmanlike manner, installed and assembled plumb, level and square. The product shall be delivered to the Owner finished complete, and ready to operate according to the manufacturer's specifications.

- 1.33 All installation work shall be completed to the standard of the samples approved by the Owner's Representative during the submittal process. Any products not installed to the quality detailed in these specifications and approved in the submittal process shall be reworked by the Installer to the satisfaction of the Owners Representative at no additional cost to the Owner.
- 1.34 Products as manufactured by "Extron" have been specified to coordinate with an existing facility and other contracts to be issued for this project. Alternate products will not be approved.

SEISMIC ANCHORING

- 1.35 All sound systems, A/V equipment or enclosures shall be anchored to the structure. Where details have not been provided on the drawings, anchorage shall comply with CBC Section 1613A. The Contractor shall submit drawings signed by the Contractor's registered structural engineer indicating method of compliance prior installation.

CLEANUP

- 1.36 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.
- 1.37 Use steel brushes on exposed metal work to carefully remove rust, etc., and leave smooth and clean.
- 1.38 During the progress of the work, keep the premises clean and free of debris.

GENERAL COORDINATION

- 1.39 The A/V drawings may reference components by manufacturer which conflict with the written specification requirements, where this occurs the written specifications shall be followed.
- 1.40 The 27 20 00 Contractor shall actively coordinate all power requirements for the Audio-Visual Systems with the Division 26 Electrical Contractor. The 27 20 00 Contractor shall coordinate the placement of the electrical outlets and hard-wired power connections at projectors, AV Systems cabinets and other equipment, with the Division 26 Contractor to determine the exact placement of the power. Outlet placement in many of the applications is critical to the space requirements and power cord length of the equipment or devices being installed.
- 1.41 Warranty: All components and installation, shall be warranted by the Manufacturer to the School District for a period of 2-years after District acceptance and sign-off of the

completed system. With the exception of the following equipment that shall be provided with longer warranties as noted;

- 1.41.1 **Provide a (3) three year warranty for all projectors provided for the project.** Provide additional warranty coverage if the projector is not already warranted for at least three years by the manufacturer. Contractor warranty is not considered equivalent to a manufacturer warranty.
- 1.42 Contractor shall provide a spreadsheet for the District provided asset tags for all newly installed AV equipment. Contractor shall provide the populated tag list at the end of the projector as part of their turn-over documents.
- 1.43 Contractor shall coordinate assignment of ALL installed IP addressable equipment. The District will provide a list of available IP addresses based of Contractors device count. Contractor shall provide a spreadsheet containing the IP and MAC addresses as well as each particular device location. This list shall also contain the Switch Port Number, and Label Description.
- 1.44 See the example below:

Room #	Device	IP (Static)	MAC	WallJack Label	Switch #	Switch Port		IDF#
								Switch # - (From top to bottom - 1,2,3, ...- use A,B,C.. in label) Switch Port - (1 - 48)
2014	Extron	10.63.155.159	0000.0322.a32b	A1-A04	1	4	Example	IDF A1 -- Top Switch (A) -- Port 4
123	Extron	10.63.155.152	0000.0322.aabb	C1-B24	2	24	Example	IDF C1 -- 2nd Switch down In stack (B) -- Port 24
2201	Cisco AP	dhcp	0012.aaaa.12ab	A2-C35	3	35	Example	IDF A2 -- 3rd Switch down in stack (C) -- Port 35
2202	<device>	dhcp	0012.aa4a.12ab	A2-C36	3	36	Example	IDF A2 -- 3rd Switch down in stack (C) -- Port 36

PART 2 — PRODUCTS

MPR Room General Requirements

- 2.1 Laptops and Document Cameras shall be furnished and installed by the District. Confirm operation of the systems with the District furnished equipment.
- 2.2 Refer to the floor plans for the room type designations that define the type and extent of the Audio-Visual System that is to be furnished for the MPR Room space.
- 2.3 The MPR Room shall incorporate a stand-alone sound system integrated with the Audio - Visual System components. Sound system will have different requirements and include different types of control systems or DSPs that will require programming by the Contractor.
- 2.4 The detail drawings show an Audio-Visual Diagram for the MPR Room requirements. The diagram does not represent all the requirements for the MPR Room AV System, but gives the Contractor a general system installation plan. Refer to the MPR Room requirements in the specifications and drawings.
- 2.5 Contractor shall meet with District and Johnson Consulting Engineers to provide Extron GUI configurator screen shots on TLC control systems for review prior to programming. This shall include (8) AV scenario presets to be programmed into the Extron control system. The Contractor shall meet to determine the individual requirements for the MPR Room.
- 2.6 Contractor shall allow a minimum of 6 hours of meeting time with School Staff and shall provide meeting minutes of the system requirements and events that transpired during

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meetings Contractor shall prepare 4-5 templates with written instructions that can be given to the school noting the settings and levels on the Digital Mixer for events such as; Assemblies, Dances, Presentations, Movie Nights, Background Music, etc. Meet with School Administrative staff to determine the types of templates required. Templates shall be a representation of the mixing board with markers showing the settings in a three-ring binder to be kept at the sound system cabinet. Pages shall be laminated.

- 2.6.1 Contractor shall provide DSP Mixer presets from Extron App and the Extron Control Panel. The School Personnel (User) shall have the ability to select and control the presets from both interactive devices. The presets shall also include the ability to integrate the projector and AV inputs when the need for both audio and video are required. For example, a Presentation preset would require the use of both the projector and the sound system with audio and video originating from one of the wallplate input locations.
- 2.6.2 Audio output frequency levels from the Mixer for each type of preset, shall use the baseline established from the SmaartLive testing. The baseline will establish a starting point for each level at the varying frequencies. The Contractor shall set the levels based on the application, ie; Assemblies Preset will focus on Voice applications; Pep Rally would focus on music as well as voice, leaning towards band music; Movie Night would focus on emulating a Cinema type of environment as much as possible; Dances would focus on the playback of modern Pop and Hip Hop music currently popular; etc. The DSP settings shall be set in conjunction with the preset applications on the mixer. The Contractor shall utilize the manufacturer's technical support staff to create equalization settings in the mixer for the presets.
- 2.6.3 The Contractor shall contact Extron for the control codes to enable the ability to activate the presets from the TLC Control Panel. The Control Panel shall be programmed with easy to follow, simple step-by-step pages that activate and disable the mixer and AV matrix switch page or event settings. Once the preset is selected from the Control Panel, the User shall not have access to the mixer controls from the TLC Control Panel, only the event presets and the standard control buttons used for every event
- 2.7 Contractor shall provide a minimum of 6 hours of meeting time with the District Personnel to build the requirements for the TLC Control panel. All programming shall be furnished and provided by the Contractor. The Contractor shall build all control panel pages and function buttons for approval by the District Project Manager and Project Engineer prior to the actual programming being completed. The control panel shall provide simple, easy to follow pages and flow functionality with the access to changes to the programming being limited to the Administrator Level password protection.
 - 2.7.1 The District shall be provided with an app to emulate the TLC Control Panel's pages and control buttons.
- 2.8 Extron Globalviewer 3.0.1 or greater. The contractor shall include programming of all assets at each room and school site into the software. The programming shall include assigning IP address as required. Coordinate with the District IT Department for access to network for loading software and setting up programming parameters.
- 2.9 Provide Extron Global Configurator Plus and Global Configurator Professional software to be used to program all system components and all of the different types of systems installations. The Contractor shall include programming of all assets in the system and the controls into the software from the central server location. The programming shall

- include assigning IP addresses, coordinate all IP addresses with the District IT Department
- 2.10 Provide design software plots of the speaker coverage and positioning using EASE software. Show dB sound level speaker coverages for each sound system application as required below. Separate designs must be submitted for each sound system. Contractor shall show coverage of audience areas on full size drawings, 30"x42" sheets and submit them to the Project Engineer for approval prior to the installation of the system. Provide elevations of speaker coverage and horizontal and vertical positioning of speakers.
- 2.11 Contractor shall submit proposed mounting details for each of the individual MPR Room's speaker, projection screen and projector mounting installations. The proposed mounting details shall be based on the structural details shown in the contract drawings. The speaker, projection screen and projector installation details in the project drawings show the minimum structural requirements and apply to general installation practices. The actual field conditions will dictate the actual speaker, projection screen and projector installation requirements and the submittals provided by the Contractor shall reflect the condition of the actual installation requirements. Contractor shall include structural calculations to meet with Zone 4 Seismic requirements for mounting of equipment that deviate from the details shown in the drawings.
- 2.12 Provide installation of Main Speakers for the MPR Room Audio-Visual System. The speakers shall be wall mounted from the structure as shown in the detail drawings. Speakers shall be mounted at the height shown on the floor plans. The mounting brackets shall match the hole pattern of the speaker. Coordinate the proper bracket with the speakers prior to ordering. Contractor shall provide all hardware including mounting brackets, safety cables, and adjustment hardware. Speakers must have the ability to be adjusted to be aimed both horizontally and vertically to adjust the angle of the speaker coverage, whether physically or electronically.
- 2.13 Provide installation of a fill speakers for the MPR Room Audio-Visual System. The speakers shall be mounted from the roof deck above the architectural clouds with the U-Bracket as shown in the detail drawings. Speaker shall be mounted at the locations shown on the floor plans. The support brackets shall match the hole pattern of the speaker. Coordinate the proper bracket with the speaker prior to ordering. Contractor shall provide all hardware including wall mount brackets, safety cables, and anchoring systems. Speakers must have the ability to be adjusted to be aimed both horizontally and vertically to adjust the angle of the speaker coverage.
- 2.14 Provide installation of Outdoor Speakers on the exterior of the MPR Building for the Outdoor Auditorium MPR Room Audio-Visual System. The speakers shall be mounted from the structural members as shown in the detail drawings. Speakers shall be mounted at the height shown on the floor plans. The support bracket shall match the hole pattern of the speaker. Coordinate the proper bracket with the speaker prior to ordering. Contractor shall provide all hardware including wall mount brackets, safety cables, and anchoring systems. Speakers must have the ability to be adjusted to be aimed both horizontally and vertically to adjust the angle of the speaker coverage
- 2.15 Contractor shall provide commissioning of the MPR Room Sound System. Provide test equipment and an operator to perform system commissioning. Commissioning will include equalization of speaker system to compensate for room acoustics and setting, including but not limited to equalization, delay, level, limiting, and crossover frequencies. Test equipment must include a minimum of SmaartLive V8 or approved equivalent running on a software manufacturer approved computer, an Earthworks M30 calibrated measurement microphone or approved equivalent, and a Sound Devices USB Pre-microphone preamp or approved equivalent. Contractor's operator must have attended a

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factory training class for the DSP software used on the project. Operator must also have attended a minimum of one (1) factory training session in the use of SmaartLive software.

- 2.16 MPR Room shall be furnished with conduit as required to install the system. Refer to the detail drawings for requirements for mounting the projector, speakers and projection screen. The projector shall be positioned to fill the projection screen exactly. Field verify the conditions for the MPR Room. Refer to the floor plans for the requirements for the MPR Room. Locations of the projector and screen, as well as speakers, are diagrammatical and all exact locations must be field verified prior to beginning installation of any equipment or ordering a lens for the projector throw.
- 2.17 Provide installation of a projection screen for the MPR Room Audio-Visual System. The MPR Room projection screen will be an electric type screen and shall be furnished with the optional Low Voltage Interface at the screen location and Low Voltage Wall Controller. Screen controls shall be programmed as a page or buttons on the TLC Control Panel. Installation shall include all low voltage cabling and power requirements. Projection screen shall be located per the drawings.
- 2.17.1 Contractor shall provide all hardware and structural support including, but not limited to, channel strut, brackets and hardware. Power shall be furnished by the Contractor. Screen must be installed to comply with local codes and Zone 4 Seismic requirements.
- 2.17.2 Projection screen will require a structural support mechanism to the building structure. The basic requirements will be detailed in the Architectural drawings and Electrical detail drawings, but the exact requirements must be field verified by the Contractor prior to installation. Contractor shall refer to the drawing details for the type of structural support system to be provided based on the type of screen used and the site conditions.
- 2.17.3 Screen shall be electric tab-tensioned. Coordinate the screen's location with the installation of the projector. The location of both the projector and screen must be properly coordinated to insure the proper image size and orientation. Projector and screen location shown on the floor plans are diagrammatical. Exact locations must be field verified by the Contractor prior to the installation of either component.
- 2.18 Contractor shall provide and install all audio and video wiring and components required per the detail drawings and specifications. Contractor shall provide all necessary cables and connectors for routing of the audio to the Mixer.
- 2.19 Contractor shall insure that the Ethernet Switch is not plugged into the power sequencers or the power strip controlled by the sequencers. The TLC Control Panel will be powered from a POE port on the switch and the TLC Panel must not lose power to insure proper operation of all components controlled by the panel.
- 2.20 All patch cables furnished by the Contractor shall be provided as outlined in the Patch Cable Section of the specifications. The patch cables shall be provided based on length and type of application. Contractor shall furnish exact quantities of the patch cables to be provided with the submittals prior to the beginning of installation of the Audio-Visual systems.
- 2.21 Contractor Note; There is no known equal for the Extron Cat-X cable shown in the details and specifications. Provide cable as required.

- 2.22 Additional Requirements
- 2.22.1 Contractor shall furnish laminated cheat sheets for MPR Room Sound System showing the functions and control flowchart to be used for each of the systems operational scenarios being programmed by the Contractor (as required by the MPR Room specification sections). The laminated cheat sheet shall reside at the sound system cabinet for the MPR Room AV system.
- 2.22.2 The Contractor shall provide MPR Room Audio-Visual Systems hand-off components (microphones, charging bases, extra patch cables, etc.) for the Sound System to the site Principal. The components shall be individually bagged up, identified with the MPR Room Name, boxed up and delivered to the site Principal. The Principal shall deliver the system components to the designated storage location for the MPR Room System.
- 2.22.3 Contractor shall set the built-in DSP on the amplifier in conjunction with the Manufacturer or a Manufacturer's Representative On-Site. The On-Site work must be done for the MPR Room once the system is installed and during the commissioning stage of the testing. Contractor shall coordinate with the Manufacturer or a Manufacturer's Representative for the factory authorized personnel to come to the project location and set the amplifier for the optimal performance.
- 2.22.4 Built-in DSP Processing Functions - Set DSP functions in the amplifier to match the speaker/subwoofer ratings to the amplifier channel. The DSP setting shall also be set to provide optimal performance for the MPR Room space.

MPR Room Audio-Visual System

- 2.23 Refer to the floor plans for the room type designations that define the type and extent of the Audio-Visual System that is to be furnished for this space.
- 2.24 Contractor shall furnish and install new speakers and subwoofers where shown on the drawings. The sound system components shall be provided with all hardware and mounting systems as shown in the drawings and specifications.
- 2.25 The 27 10 00 Contractor shall furnish the 2-Port data outlet at the wall mounted Sound Cabinet Enclosure location and at the Local Origination input wallplates, as shown on the floor plans. Coordinate with the 27 10 00 Contractor for the location of the data outlet in the enclosure.

Audio System

- 2.26 All system equipment shall be rack mounted in a floor mounted, roll-out, rotating system cabinet. Refer to detail drawings for cabinet requirements. Location of cabinet shall be as shown on the building floor plans. Sound system shall be provided with the following components;
- 2.27 Digital Rack Mounted Mixer
- 2.27.1 19" Rack Mountable
- 2.27.2 All-in-One rack-style digital mixer
- 2.27.3 Inputs: 16 mic/line (XLR/TRS combo) + 1 stereo line (RCA pin)

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- 2.27.4 Output: 16 (8 XLR + 8 TRS phone)
- 2.27.5 Channels: 40 (32 mono + 2 stereo + 2 return)
- 2.27.6 Aux Buses: 20 (8 mono + 6 stereo)
- 2.27.7 Stereo Buses: 1
- 2.27.8 Networked remote control for show setups with on-screen software editor via Ethernet
- 2.27.9 Provide (1) Audio Interface Card (NY-64D)
- 2.27.10 Provide Yamaha TS Stage Mix and Monitor Mix Remote Software Package and APP with Android Software interface on the Samsung Android Tablet for remote mixing capabilities. Software shall include all software updates up-to and including the date of final sign-off from the client.
- 2.27.11 Provide Yamaha Model #Tio1608-D Dante-equipped I/O rack mounted expansion Stage Box with 16 microphone/line inputs and 8-line outputs. Provide Tio Racks Stage Box with recallable D-PRE™ microphone preamplifier. Contractor shall provide the TF Series Stage Box with the Optional Model #NY64-D Card in the Main Mixer.
 - 2.27.11.1 The TF Series Stage Box shall be rack mounted in the Sound System Cabinet. The Expansion Stage Box shall be mounted near the center of the cabinet so that all of the XLR Inputs/Outputs will be accessed from the front of the cabinet but won't be in the way of the front door or panels. Leave the space on the front set of rack rails directly in front of the Expansion Box open (no filler panels).
- 2.27.12 Provide highest level of Yamaha TF firmware upgrade available at time of installation of mixer. The Mixer firmware shall be updated prior to any programming of the system. Provide a copy of the latest firmware version on a USB Flash Drive to be included with the Close-Out Package.
- 2.27.13 Contractor shall program Mixer and Tablet APP as a turn-key installation for control of the sound system. In addition to the Android Tablet, the Contractor shall program an additional (5) devices (Smartphone, Tablet, iPod, Laptop, etc.) of the District's choosing for the Principal, Coaches, Band Teacher or any other Authorized User of the Sound System.
- 2.27.14 Contractor shall allow for a minimum of 8 hours of additional programming time, above the amount allowed in the General Requirements, for changes made after the system has been installed and commissioned.
- 2.27.15 All programming shall be set up to disallow any changes to the mixer levels and system pre-sets to be done by an Administrator Level password access only. Standard users may only access live application sound processing and not be able to alter the pre-sets.
- 2.27.16 The 2-Port data outlet shall be furnished by the 27 10 00 Contractor at Sound Cabinet for Mixer and Ethernet connections. Connect mixer to network and coordinate the IP address requirements with the District IT Department.

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- 2.27.17 Provide Yamaha Model #TF-RACK – Rack-Mount Digital Mixer with apps and all TF Rack Software Packages including TF Stage Mix, TF Monitor Mix and TF Editor.
- 2.27.18 Contractor shall provide Exterior Speakers for the Outdoor Amphitheater at the back of the MPR Building. Provide control of the Exterior Speakers from the Mixer App as a separate zone. The Outdoor Amphitheater shall be provided with a separate control page on the TLC Control Panel. Refer to the floor plans and these specifications for additional requirements.
- 2.28 Contractor shall furnish the Galaxy Android Tablet with the mixer. Tablet shall be furnished with a cover case (Color as chosen by district). The Galaxy Android Tablet shall be furnished with the “Yamaha Mixer Apps” loaded on the tablet and fully programmed. Contractor shall insure that the latest version of the App available at the time, is loaded on the pad device.
- 2.28.1 Provide an Android-Based Samsung Galaxy Model “Galaxy Tab S7 11” Diagonal TFT Screen, Wi-Fi Only Model, 512-GB Memory, WQXGA 2560 x 1600 Resolution, 500nit Brightness and DCI-P3 Color Range.
- 2.28.2 Provide a full cover case for the Android Tablet - Model #Galaxy Tab S7 Bookcover – Color shall be Black. Case shall be stored with the microphones in the Storage Drawer.
- 2.28.3 Contractor shall be responsible for all programming and set-up of the Android Tablet and the Yamaha TF-RACK Digital Mixer. Contractor shall submit program set-up and pre-sets for approval to Project Engineer and District IT Director prior to completing the full programming of system. Contractor shall program Mixer and Android Tablet as a turn-key installation for control of the sound system.
- 2.28.4 The Galaxy Tablet shall be stored in the lockable Storage Drawer in the Sound System Cabinet. Route charging cable from the power strip to the Storage Drawer so Tablet may be charged while unit is stored in the drawer.
- 2.28.5 Provide programming presets for the Galaxy Tablet for the Mixer DSP Software for that application. The Audio Only presets will provide built-in limitations for adjustment of the levels of the audio sources. The mixer shall be programmed with an Administrator level access that allows the Administrator to get into the fine adjustments and control of the programming. In addition, a User level access page will be programmed that will block out all but the volume levels, source selections, Mic level control and speaker output zone control. The Exterior Amphitheater Main Speakers shall be a separate zone from MPR Room Speakers. Zones shall be programmed to operate independently or in conjunction with each other.
- 2.28.6 Coordinate with the site Music Teachers and the site Principal for additional information concerning presentation modes. The Contractor shall provide an additional (6) hours of programming of Mixer, Galaxy Tablet and TLC Control Panel to be used for extra requirements after the initial set-up has been completed and system is actually in use by the school. The extra hours shall be used after all of the initial programming has been completed and the system has been tested

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- 2.29 Provide a Wireless Wifi and Bluetooth Audio Streaming Receiver/Pre-Amp at the Sound Cabinet for Local User Input from a handheld device (Smartphone, Tablet, iPod, etc.) or wirelessly from a Laptop Computer, streaming music from the Internet and for Internet Radio station broadcasting. Streaming and Internet functions shall be controlled from a handheld device or computer with the manufacturer's APP for that purpose.
- 2.29.1 The Wireless Wifi and Bluetooth Audio Streaming Receiver's main unit shall be installed in the Sound Cabinet, on a single 1RU shelf in the cabinet provided by the Contractor. The receiver shall be secured to the shelf using Velcro safety straps. The receiver installed outside the enclosure cabinet insures that it can clearly receive signals from the local Wi-Fi network and paired User Bluetooth devices.
- 2.29.2 Provide (2) adjustable rack shelf straps to hold the Receiver in place and secure it to the shelf. Strap must be routed around the Receiver on the sides, not on the front/back of the Receiver where they can block any connections or indicators on the equipment. Straps shall be constructed of a nylon material, a minimum of 1" wide, with a plastic snap buckle. Provide Rack Shelf Straps as manufactured by Rack Solutions Part #1USHL-STRAP (or approved equal). Since straps come 72" in length, The Contractor shall trim off all but 12" of slack after securing the equipment to the shelf.
- 2.29.3 Provide a low-profile 1RU Universal Mounting shelf in the cabinet for the Wireless Wifi and Bluetooth Audio Streaming Receiver. Strap the Receiver to the shelf. Shelf may be used for securing power supplies or other ancillary equipment in the cabinet. Provide 11.5" Deep Universal Mounting Shelf by Middle Atlantic Model #UMS1-11.5 (or approved equal).
- 2.29.4 Route the RCA L/R Stereo Audio output on the Receiver to the Stereo Input #1 input terminals on the Rack Mount Mixer. Set the output toggle switch to "Pre-Amp" on the output audio panel on the back of the Receiver. Provide a RCA Stereo (L/R) to ¼" bayonet Stereo (L/R) end cable to the ¼" input connection on the Mixer.
- 2.29.5 Provide IR Control extension cable to the TLC Control Panel. Connect the IR Control cable to the 3.5mm bayonet style "Remote In" port on the rear of the Receiver. The "Remote In" port on the Receiver is specifically provided for remote operations. Connect the IR Control cable to the Port Expansion Adapter on the rear of the TLC Control Panel.
- 2.29.6 Contractor shall extend and mount the Bluetooth Antenna on the outside of the Sound Cabinet. The antenna connection shall be extended with a coaxial cable to the location on the outside of the cabinet. The antenna shall be installed clear of the top of the cabinet. The Contractor shall make the field modification to the cabinet and shall completely seal the penetration through the cabinet.
- 2.29.7 Provide a Category-6 patch cable from the Ethernet Switch in the Sound Cabinet to the Receiver's RJ45 network port. Set the "Wireless Switch" toggle switch on the back of the Receiver to the wired LAN port position for connectivity via the network WAPs and hard-wired connections. Coordinate with the District IT Department to insure that the system will allow for User Access from the APP on their wireless handheld devices. All connections shall be provided through the hard-wired LAN port. Coordinate IP addressing of the Receiver with the District IT Department.

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- 2.29.8 Load the “Yamaha MusicCast” APP on the Android Tablet, the TLC Control Panel and the User’s Smart Devices and provide training in the use of the MusicCast APP and how it is related to the exact set-up of the system for the Stadium. Load the “Yamaha MusicCast” APP on the Android tablet and provide a page showing the APP’s options.
- 2.29.9 Provide Wireless Wifi and Bluetooth Audio Receiver/Pre-Amp by Yamaha with IR Remote Control Model #WXC-50.
- 2.29.10 Sirius Radio via the Internet Radio function on the Wireless Wifi and Bluetooth Audio Receiver/Pre-Amp, shall be furnished with a Sirius Radio Account for full access of Sirius Radio stations and full internet access through Sirius radio’s APP. Contract shall include (3) years of Sirius Radio service. Contractor shall provide account information and training for access to the Athletic Staff. The Sound System shall use Sirius Radio account for the Receiver.
 - 2.29.10.1 Contractor shall provide (10) Sirius Radio station presets based on the input from the Administrative and Athletic Staff and test all stations for proper operation.
 - 2.29.10.2 Contractor shall program (10) Internet Radio stations in addition to the Sirius Radio stations based on the input from the Administrative and Athletic Staff and test for proper operation.
- 2.29.11 Provide all outputs to the rack mounted mixer. Set Mixer levels based on outputs from the APPS and reception quality
- 2.30 (1) 8-Channel Power Amplifier for the MPR Room Mains, Subwoofers and Outdoor Amphitheater Speakers:
 - 2.30.1 Power Output - 1250W @ 4-ohms
 - 2.30.2 Power Output - 1250W @ 8-ohms
 - 2.30.3 Power Output - 2500W @ 4-ohms or 8-ohms bridged per channel pair
 - 2.30.4 Each Main L/R MPR Room Speaker shall be connected to the amplifier, one per channel, at 8-ohms each, attaining stereo mode for main speakers. Each individual speaker shall be wired to the amplifier on a separate channel.
 - 2.30.5 Each MPR Room Subwoofer shall be connected to the amplifier, one per channel, at 8-ohms each. Each individual Subwoofer shall be wired to the amplifier on a separate channel.
 - 2.30.6 Each Outdoor Amphitheater L/R speaker shall be connected to the amplifier, one per channel, at 8-ohms each, attaining stereo mode for Outdoor speakers. Each individual speaker shall be wired to the amplifier on a separate channel.
 - 2.30.7 Frequency Response – 7Hz to 30kHz @ 4-Ohms, -2.5dB points
 - 2.30.8 Built-in DSP Processing Functions - Set DSP functions in the amplifier to match the speaker/subwoofer ratings to the amplifier channel. The DSP setting shall also be set to provide optimal performance for the MPR Room space and for the Outdoor Amphitheater.

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- 2.30.9 The Outdoor Amphitheater Speakers shall operate independently from the speakers in the Main MPR Room. Set channel DSPs for the Outdoor speakers to respond to a separate input from the Mixer.
- 2.30.10 Confirm and coordinate the power receptacle requirements with the Division 26 Contractor. The Amplifier shall be plugged into the 30A Juice Goose Sequenced power receptacle Pod.
- 2.30.11 Linea Research Model # 88C10
- 2.31 (1) 8-Channel Power Amplifier for the MPR Room Fill Speakers:
 - 2.31.1 Power Output - 450W @ 4-ohms
 - 2.31.2 Power Output - 450W @ 8-ohms
 - 2.31.3 Power Output - 1600W @ 8-ohms bridged per channel pair
 - 2.31.4 MPR Room pairs of Front and Rear Fill Speakers shall be connected to the amplifier, one speaker per channel, at 8-ohms on a single amplifier channel. Set delays on Front and Rear fill speakers to insure timing matches Mains Speaker levels and the timing shall be synchronized between the Front and Rear Fills. Individual fill speaker shall be wired to the amplifier on a separate channel.
 - 2.31.5 Frequency Response – 20Hz to 20kHz, +/-0.5dB
 - 2.31.6 Built-in DSP Processing Functions - Set DSP functions in the amplifier to match the speaker ratings to the amplifier channel. The DSP setting shall also be set to provide optimal performance for the MPR Room space.
 - 2.31.7 Confirm and coordinate the power receptacle requirements with the Division 26 Contractor. The Amplifier shall be plugged into the 30A Juice Goose Sequenced power receptacle Pod.
 - 2.31.8 Linea Research Model # 88C06
- 2.32 Provide (1) Roll-out Rotating equipment cabinet with fixed base and pivoting equipment area:
 - 2.32.1 Height 89" x 33" overall depth (26"usable depth) x 24 width
 - 2.32.2 Provide solid front locking solid door. Match all locksets for the cabinet
 - 2.32.3 (1) cabinet fan and control system, Model QBP-2A fan panel (120V, 100CFM, 32dB, Anodized)
 - 2.32.4 Automatic thermostatic fan control, Model #FC-2-215-1CA
 - 2.32.5 Provide an additional set of vertical rack rails in the center of the cabinet for the Mixer Stage Box Expansion Unit. Refer to the Mixer specifications for additional requirements.

- 2.32.6 Storage drawer by Middle Atlantic Model #D5LK with lock set to match the lock provided for the front door
 - 2.32.7 Blank panel – Middle Atlantic # SB1 – Fill in all open spaces with blank panels
 - 2.32.8 Vented panel – Middle Atlantic # VT1 –Provide vented panels above and below each amplifier
 - 2.32.9 Middle Atlantic # WR-44-32 series
- 2.33 Rack Mounted Sequenced Power Control System in AV Cabinet
- 2.33.1 Power Switched/Sequenced outlets for complete activation and shut down control via the rack mounted controller. Refer to the Detail Drawings Sound System Power Diagram for additional requirements.
 - 2.33.2 Connect the rack mounted PDU/Controller to the sequenced power control “Pods” mounted in the rear of the AV Cabinet. See detail drawings for additional information. The Contractor shall be responsible for setting the proper sequencing for all Pods connected to the PDU/Controller and for all of the devices connected to the “Pods”.
 - 2.33.3 The “Pods” shall be connected to the PDU/Controller with an Eight-wire, RJ45 low voltage patch cable. The patch cable connections do not follow standard EIA/TIA or BICSI standards for the wiring configuration. DO NOT USE CAT-5E or CAT-6 type data patch cables for the connections from the “Pods” to the PDU/Controller. Refer to the manufacturer’s installation practices and manual to insure the proper wiring configuration to used.
 - 2.33.4 Rack Mounted PDU/Controllers; Provide (2) 19” rack mounted 120V 20-Amp PDU/Controllers with (3) sequenced duplex receptacles and (1) unswitched single receptacle on the rear of the PDU. PDU/Controller shall have a built-in circuit breaker, AC line surge protection, a multi-stage AC line filter and three event sequencing ability. PDU/Controllers shall be furnished with a 120V, 20-Amp, L5-20P input plug with 10-foot single phase power cord connection. Provide PDU/Controllers as manufactured by Juice Goose Model #CQ-1520. Plug PDU/Controllers, one each into the (2) duplex receptacles in the rear of the AV cabinet.
 - 2.33.5 Sequenced Power Control Pods; Provide (2) sequenced power control “Pods” in the rear of the AV cabinet to provide a sequenced power connection for the amplifiers. Provide (2) 120V, 30-Amp “Pods” with (1) 30-Amp twist-lock receptacle in a self-contained junction box hard-wired to a 120V, 30-Amp circuit. “Pods” shall be connected to the CPU/Controller with the low voltage control patch cable. Provide sequenced power control “Pods” as manufactured by Juice Goose Model #CQ3000 (NEMA L5-30R).
 - 2.33.6 Power Strips; Provide (1) power strip for power to the wireless microphone charging bases, Android Tablet Charger and the Ethernet Switch. The power strip shall be plugged directly into one of the duplex receptacles so that the chargers can continue to charge even if the rest of the system is powered down. Power strip must be mounted directly above the rack mounted shelf. The power strip shall be used as the location to plug in the LED Light for Sound Cabinet. Power strip shall be provided with a 3-year warranty. Provide (1) Juice

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- Goose Model #JG11-20A Power Strip. Refer to the detail drawings for additional requirements.
- 2.33.7 The Division 26 Contractor will provide (2) 120V, 20-Amp duplex receptacles and the power connection for (2) 30-Amp hard-wired 120V, 30-Amp circuits in the rear of the AV Cabinet for sound system power connections. Contractor shall coordinate with the 260000 Electrical Contractor for location of duplex receptacle and hard-wired connections to the “Pods” in the rear of the AV cabinet.
- 2.33.8 Amplifier shall be connected to the Sequenced Power Control Pods, FIRST, then Mixer and other equipment shall be connected to the PDUs and power strip. Contractor shall evenly distribute the power requirements across the PDU circuits. The small, low powered equipment such as the ADA Transmitter, Microphone Receivers, fan controller, etc. shall be connected to the sequencers as shown in the Sound System Power Diagram.
- 2.33.9 Contractor shall furnish the Project Engineer with a detailed summary of the electrical connections to the PDU/Controller and sequencing Pods and the proposed outlet sequence to show proper delay for system start-up and shut down.
- 2.33.10 The Ethernet Switch in the AV Cabinet must not be plugged into the power sequencer or any outlet controlled by the sequencers. The Ethernet Switch shall be plugged into the power strip that is directly plugged into one of the duplex outlets as shown in the Sound System Power Diagram
- 2.34 A complete Assistive Listening system shall be integrated into the sound reinforcement system. Mount the transmitter in the audio-visual cabinet. Adjust as required for total coverage of seating area. Antenna shall be mounted just below the accessible ceiling space in the MPR Room where shown on the drawings. Provide Listen Technologies Model Assistive Listening System package shall include;
- 2.34.1 Assistive Listening Systems shall be provided in accordance with CBC Section 11B-219 and shall comply with CBC Section 11B-706.
- 2.34.2 Per ADA Assistive Listening System CBC Section 11B-706.3 – “The minimum number of receivers to be provided shall be equal to 4% of the total number of seats, but in no case less than two. 25% minimum of receivers provided, but no fewer than two, shall be hearing aid compatible.
- 2.34.3 If the system provided is limited to specific areas or seats, then such areas or seats shall be within a 50-foot viewing distance of, and have a complete view of the stage or playing area per CBC Section 11B-219.4
- 2.34.4 (1) Transmitter - Listen technologies LT- 803-072-01
- 2.34.5 (12) Receivers with integrated neck loop/lanyard with ear speaker - Listen technologies LR-5200-072-P1
- 2.34.6 (1) Antenna - Wall Mount antenna with antenna cable extension to the location shown on the floor plans from the Sound Cabinet
- 2.34.7 (1) Transmitter rack mount assembly

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- 2.34.8 (1) Carrying and charging case for receivers – LA-311
- 2.34.9 (5) ADA Signs for entrances to the MPR Room – Model LA-303 - To be installed by the 27 20 00 Contractor at locations designated by the Architect
- 2.34.10 (2) Packs of disinfecting wipes Model #LA-901.
- 2.34.11 Provide a sterilization kit of 100 wipes for the ear buds, Model #LA-902 (provide total of 5-20 count individually wrapped wipes)
- 2.35 Provide wireless microphone system consisting of the following:
 - 2.35.1 Digital Wireless Combo Quad Channel Systems Package by Shure Model #ULXD4Q (Or approved equal by Sennheiser). Provide Receiver with rack mount kit. All Digital Wireless System components shall be frequency matched.
 - 2.35.1.1 Provide of extension of the Antennas for both Channels “A” & “B” from the Receiver. Provide antenna cable, cable type as required to reduce the gain loss, for the Antenna extension. Length of cable shall be as required. Routes cables from the Receiver to the antenna locations mounted in the MPR Room, as indicated on the drawings. Provide (2) Model #PA805 Directional Antennas. Antennas shall be placed where indicated on the floor plans.
 - 2.35.2 Provide (4) Shure #ULXD1 Digital System Body Packs with ¼ wave antenna and frequency/power lockout. Body Packs shall be furnished with Model #SB900A Lithium-Ion battery with 9-hour battery life.
 - 2.35.2.1 Digital System Body Packs shall be furnished with (2) #WL185 cardioid (130° Pickup) lavalier microphones and (2) Model #WCM16 Headworn Electret Condenser Microphones.
 - 2.35.3 Provide (4) Shure #ULXD2/SM58 Digital System Handheld Microphones with Cardioid (unidirectional) dynamic pickup pattern, On/Off/Mute Switch and frequency/power lockout. Body Packs shall be furnished with Model #SB900A Lithium-Ion battery with 12-hour battery life. Provide each Microphone with Model #A58WS Microphone Windscreen.
 - 2.35.3.1 Provide Handheld Microphones each with Model #A58WS Microphone Windscreen and Model #WA371 Microphone Clip.
 - 2.35.4 Provide (4) Spare Model #SB900A Lithium-Ion batteries
 - 2.35.5 Provide (1) Shure Model #SBRC Rack-Mount Battery Charger with (4) #SBC-AX Charging Modules for the Rack-Mount Battery Charger. All Charger Modules shall be provided with power cables.
 - 2.35.6 Microphones and Body Packs shall be provided with storage bags. All microphones shall be stored in the lockable Storage Drawer.
- 2.36 Provide (2) cardioid ceiling hung choral microphones with minimum frequency response of 30Hz to 30kHz.

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- 2.36.1 Microphone shall be provided with optional XLR connector accessory (confirm Male or Female prior to ordering based on ceiling XLR outlet installed) Option Earthworks #C30-XLR
- 2.36.2 Provided with balanced braid-shielded Canare StarQuad microphone cable on a flexible gooseneck type housing (Contractor shall custom order length of cable to allow an adjustment height from 9' to 5' AFF) The microphone shall be hung at 9' AFF, with slack on both the cable to allow adjustment of the height) Option Earthworks #C30-CCL
- 2.36.3 Color shall be chosen by District as either Black or White
- 2.36.4 Electronics housed in microphone
- 2.36.5 Provide foam windscreen accessory
- 2.36.6 Earthworks Model # C30/C plus options as specified (The microphone shall be furnished with a base mounted Male XLR connector
- 2.37 Provide (2) Hard-Wired Handheld Microphones with minimum frequency response of 50Hz to 18kHz. Microphone shall have on-off switch with lock "on" feature and adjustable swivel adapter.
 - 2.37.1 Provide wind screen for all microphones
 - 2.37.2 Provide (2) Shure Model #SM86 Cardioid Handheld Microphones. (Or approved equal by Sennheiser)
- 2.38 Provide (4) full height microphone stands with booms
 - 2.38.1 (4) "Ultimate" Pro-T-T with telescoping boom (no approved equal)
- 2.39 Provide microphone input wallplates in the MPR Room where shown on the floor plans. Input wallplates shall be female XLR connections and wired directly to the mixer in the AV Cabinet. Wallplates shall be Decora style to match the color of the Audio-Visual input wallplates.
- 2.40 Provide Monitor Return Channel outlets at the Microphone outlet locations shown on the floor plans. Each Monitor Return Outlet shall be programmed to be routed from the Mixer to the outlet location.
- 2.41 Microphone Cables: Provide (2) 15'-0" and (2) 25'-0" long, constructed with Canare L4E6S cable, 95% braid, shielded cable assemblies. Provide Microphone cable assemblies as manufactured by Whirlwind, Model MKQ Quad.
- 2.42 Microphone Jacks: Provide Switchcraft J3FS or Neutrik wall jacks per drawings.
- 2.43 Microphone Jacks: Provide Switchcraft J3FS or Neutrik wall jacks per drawings

Speakers

- 2.44 The Main speakers shall be mounted on each side of the Stage and fill speakers shall be mounted on the deck above the Architectural Clouds positioned in the center of the room. The wall mounted support brackets shall be mounted at the height shown on the floor

plans and anchored to the wall. Speakers mounted to the deck above shall be furnished with Unistrut support system as required. Exterior Speakers shall be wall mounted on the Outside wall of the Building where indicated on the drawings. Refer to the detail drawings for the minimum structural support requirements for the speakers. Coordinate with the Architect and Structural Engineer for any additional requirements to support the weight of the Speakers.

- 2.45 Provide (2) Main Wall Mounted Speakers positioned on the wall on each side of the Stage area in the MPR Room. Speakers shall be installed at the locations as shown on the floor plans. Speakers shall be wall mounted using the wall mount brackets and installed as shown in the drawing details. Speakers must have the ability to be adjusted to adjust the Horizontal and Vertical coverage, aim speakers for the angle of the desired speaker coverage. Speakers shall be aimed to miss the front of the Stage to avoid microphone feedback. Contractor shall provide all hardware including wall mount brackets, safety cables and anchoring systems. Provide design drawings of proposed mounting configurations. The design drawings shall include independent structural calculations to verify compliance with seismic zone 4 requirements. Shown on MPR Room floor plans as TYPE "A".
- 2.45.1 Passive Two-way, Full Range, high output loudspeaker system
 - 2.45.2 (1) 12" LF Differential Drive driver with 3" dual voice coil
 - 2.45.3 (1) 1.5" HF Exit Compression driver with 3" dual voice coil
 - 2.45.4 Program Power rating 600 watts (1200W Peak) @ 8 ohms
 - 2.45.5 Coverage pattern 60° vertical x 60° horizontal.
 - 2.45.6 Aim speakers to provide proper coverage in room while avoiding the stage area to prevent microphone feedback. Contractor shall confirm coverage area with required EASE plot submittal.
 - 2.45.7 Maximum 28" high x 14" wide x 18" deep x 51 Lbs, White Finish
 - 2.45.8 Mains Speakers JBL Model #AM7212/66
 - 2.45.9 Provide mounting assembly by Adaptive Technologies Model # MM-120-7212-AP (No Approved Equal)
 - 2.45.10 Provide rope sling hardware and braided steel type safety cable attached to wall or to support bracket behind speaker and to one of the threaded M10 attachment points on the speaker. Refer to drawing details for additional information.
 - 2.45.11 All rigging hardware shall be rated a minimum Grade-5 hardened steel. Standard hardware store grade fasteners will not be allowed.
- 2.46 Provide a total of (2) Front-of-House fill speakers mounted to the roof deck (Joists) above the Architectural Clouds, at the location shown on the floor plans. Speakers must have the ability to be adjusted to adjust the Horizontal and Vertical coverage, aim speakers for the angle of the desired speaker coverage. The speakers shall be mounted using Unistrut and the Adaptive Technologies Ceiling Mount support as shown in the drawing details and in these specifications. Refer to the detail drawings for additional requirements. Contractor shall provide all hardware including Unistrut, ceiling mount adapters, safety

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cables and anchoring systems. Provide design drawings of proposed mounting configurations. The design drawings shall include independent structural calculations to verify compliance with seismic zone 4 requirements. Shown on MPR Room floor plans as TYPE "B".

- 2.46.1 Full range, passive, compact two-way high output loudspeaker system
 - 2.46.2 (1) 8" - SFG Low Frequency woofer with a 2.5" Edge-wound Voice Coil
 - 2.46.3 (1) 1" Exit High Frequency compression driver with 1.5" Voice Coil
 - 2.46.4 Program Power rating 500 watts @ 8 ohms
 - 2.46.5 Coverage pattern 90° horizontal x 50° vertical (Rotate horn and mount speaker horizontally) The speakers shall be aimed for Front of House Fill
 - 2.46.6 Speakers shall be mounted side by side to provide a total combined Coverage pattern of 180° horizontal x 50° vertical. Contractor shall confirm coverage area with required EASE plot submittal.
 - 2.46.7 Provide Front-of-House Fill speaker by JBL #AC18/95
 - 2.46.8 Maximum 18.5" high x 10" wide x 10" deep x 28 Lbs., Black Finish
 - 2.46.9 Provide Unistrut and ceiling mount adapters for mounting of speaker to the joists above the clouds as shown in the detail drawings. Orient speaker horizontally and rotate horn to maintain the proper speaker coverage pattern. Install speaker to the structure as shown in the detail drawings. Provide ceiling mount by Adaptive Technologies Model #MM-3RDX-18 (No Approved Equal). Confirm proper speaker plate adapter for mount prior to ordering.
 - 2.46.10 Provide rope sling hardware and braided steel type safety cable attached to the Unistrut on ceiling and to one of the threaded M8 attachment points on the speaker. Refer to drawing details for additional information.
 - 2.46.11 All rigging hardware shall be rated a minimum Grade-5 hardened steel. Standard hardware store grade fasteners will not be allowed.
 - 2.46.12 Set program levels and any required delays on subwoofer amplifier channels to match the timing from the Main House Speakers
- 2.47 Provide a total of (2) Rear-of-House fill speakers mounted to the roof deck (Joists) above the Architectural Clouds, at the location shown on the floor plans. Speakers must have the ability to be adjusted to adjust the Horizontal and Vertical coverage, aim speakers for the angle of the desired speaker coverage. The speakers shall be mounted using Unistrut and the Adaptive Technologies Ceiling Mount support as shown in the drawing details and in these specifications. Refer to the detail drawings for additional requirements. Contractor shall provide all hardware including Unistrut, ceiling mount adapters, safety cables and anchoring systems. Provide design drawings of proposed mounting configurations. The design drawings shall include independent structural calculations to verify compliance with seismic zone 4 requirements. Shown on MPR Room floor plans as TYPE "C".
- 2.47.1 Full range, passive, compact two-way high output loudspeaker system

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- 2.47.2 (1) 8" - SFG Low Frequency woofer with a 2.5" Edge-wound Voice Coil
- 2.47.3 (1) 1" Exit High Frequency compression driver with 1.5" Voice Coil
- 2.47.4 Program Power rating 500 watts @ 8 ohms
- 2.47.5 Coverage pattern 90° horizontal x 50° vertical (Rotate horn and mount speaker horizontally) The speakers shall be aimed for Rear of House Fill
- 2.47.6 Speakers shall be mounted side by side to provide a total combined Coverage pattern of 180° horizontal x 50° vertical. Contractor shall confirm coverage area with required EASE plot submittal.
- 2.47.7 Provide Rear-of-House Fill speaker by JBL #AC18/95
- 2.47.8 Maximum 18.5" high x 10" wide x 10" deep x 28 Lbs., Black Finish
- 2.47.9 Provide Unistrut and ceiling mount adapters for mounting of speaker to the joists above the clouds as shown in the detail drawings. Orient speaker horizontally and rotate horn to maintain the proper speaker coverage pattern. Install speaker to the structure as shown in the detail drawings. Provide ceiling mount by Adaptive Technologies Model #MM-3RDX-18 (No Approved Equal). Confirm proper speaker plate adapter for mount prior to ordering.
- 2.47.10 Provide rope sling hardware and braided steel type safety cable attached to the Unistrut on ceiling and to one of the threaded M8 attachment points on the speaker. Refer to drawing details for additional information.
- 2.47.11 All rigging hardware shall be rated a minimum Grade-5 hardened steel. Standard hardware store grade fasteners will not be allowed
- 2.47.12 Set program levels and any required delays on subwoofer amplifier channels to match the timing from the Main House Speakers and Front Fill Speakers.
- 2.48 Provide a total of (2) Subwoofers mounted to the roof deck (Joists) above the Architectural Clouds, at the location shown on the floor plans. Subwoofers shall be installed at the locations as shown on the floor plans. Subwoofers shall be mounted using Unistrut and the Adaptive Technologies Ceiling Mount support as shown in the drawing details and in these specifications. Contractor shall provide all hardware including mounting brackets, rigging and hardware, safety cables, and anchoring systems. Provide design drawings of proposed mounting configurations. The design drawings shall include independent structural calculations to verify compliance with seismic zone 4 requirements. Shown on MPR Room floor plans as TYPE "D".
 - 2.48.1 Compact High-Power Compact Low Frequency subwoofer system
 - 2.48.2 12" Differential Drive Dual Voice Coil and 3" Dual Coil Dual Gap Neodymium Transducer
 - 2.48.3 Program Power rating 1400 watts @ 8 ohms
 - 2.48.4 Maximum 16" high x 14.5" wide x 19" deep x 36 Lbs., Black Finish
 - 2.48.5 Provide subwoofers JBL ASB6112 (or approved equal by Klipsch KI-112-SMA-II Series)

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- 2.48.6 Order installation series version of the subwoofers without handles or pole cups. Hang subwoofer by manufacturer installed threaded M10 mounting points.
- 2.48.7 Provide Unistrut and ceiling mount adapters for mounting of subwoofer to the joists above the clouds as shown in the detail drawings. Subwoofers shall be mounted fixed from the structure above. Install subwoofers to the structure as shown in the detail drawings. Provide ceiling mount by Adaptive Technologies Model #MP-500NPT-TA (No Approved Equal) Unistrut to ½" NPT adapters.
- 2.48.8 Provide rope sling hardware and braided steel type safety cable attached to the Unistrut on ceiling and to one of the threaded M10 attachment points on the subwoofer. Refer to drawing details for additional information.
- 2.48.9 Set program levels and any required delays on subwoofer amplifier channels to match the timing from the Main House Speakers.
- 2.49 Provide (2) Exterior Outdoor Speakers for Outdoor Amphitheater wall mounted outside of the MPR Room, as shown on the floor plans. Speakers shall be mounted to provide coverage for the outdoor seating area. These speakers shall be zoned separately to be used as either stand-alone speakers or combined with the speakers in the MPR Room as overflow support. Speakers shall be wall mounted with the installation brackets by the speaker manufacturer at the height shown on the floor plans. Contractor shall provide all hardware including safety cables and mounting hardware. Shown on MPR Room floor plans as TYPE "E".
 - 2.49.1 Full range, medium power, passive two-way Weather-Resistant loudspeaker system
 - 2.49.2 (1) 12" LF Ferrite driver with 2.5" voice coil
 - 2.49.3 (1) 1.4" HF Exit, 3" voice coil, hybrid titanium/polyimide diaphragm with ferrite compression driver
 - 2.49.4 Program Power rating 1200 watts (2400W Peak) @ 8 ohms
 - 2.49.5 Coverage pattern 90° horizontal x 40° vertical. Contractor shall confirm coverage area with required EASE plot submittal.
 - 2.49.6 Aim speakers to provide proper coverage of the Outdoor Amphitheater seating area while avoiding the stage area as much as possible to prevent microphone feedback.
 - 2.49.7 Maximum 28" high x 14.5" wide x 18" deep x 65 Lbs. Speakers shall be provided with Outdoor Ordering Option
 - 2.49.8 Exterior Outdoor Speakers Community Model #IP6-1122/94
 - 2.49.9 Speaker shall be ordered with Outdoor Option finish and construction: Grille Construction - Marine grade aluminum with zinc-rich dual-layer grey powder-coat, Acoustically transparent woven Black Fabric Backing with hydrophobic treatment; Speaker Enclosure Construction - 15mm PolyGlas, Grey Color (RAL7038), Industrial-grade Exterior-rated Finish Coating, heavily textured.

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Custom color may be provided per District request. Confirm color requirement prior to ordering speakers.

- 2.49.10 Provide Reinforced 304-Stainless Steel wall mounting U-Brackets by Community Model # IUB1122WRG – Grey Color (No Approved Equal - Standard Interior U-Bracket Version not equal). Contractor shall order mounting brackets to match the color of the Speakers
- 2.49.11 Provide stainless steel rope sling hardware and braided stainless steel type safety cable attached to wall or to support bracket behind speaker and to one of the threaded M10 attachment points on the speaker. Refer to drawing details for additional information.
- 2.49.12 All rigging/mounting hardware for outdoor installation shall be vandal resistant and stainless steel, rated a minimum Grade-5 hardened steel. Standard hardware store grade fasteners will not be allowed.
- 2.49.13 Set program levels and any required delays for the Outdoor Amphitheater Speakers when programmed to operate simultaneously as overflow with the Mian MPR Room Speakers.
- 2.49.14 Program a separate page on the Control Panel for Stand-Alone Preset Operation of the Outdoor Amphitheater Speakers.

Video System

- 2.50 Provide installation of a projector and projection screen with audio/video components and all local wiring. Projector and screen shall be located per the drawings. Refer to the AV wiring diagrams for additional information and requirements.
- 2.51 All patch cables shall be furnished as described in the Audio-Video Patch Cable Section of this specification.
- 2.52 Install Extron Digital Audio-Visual Matrix Switch in the AV Cabinet. All audio and video from the HDMI Interface wallplates in the MPR Room, Wireless Wifi and Bluetooth Audio Streaming Receiver/Pre-Amp and the Blu-Ray Player in the AV Cabinet, shall be routed to the matrix switch. The video and audio outputs from the matrix switch shall be routed to the Projector and Sound System Mixer respectively. Refer to the MPR Room AV Diagram for additional requirements.
- 2.53 Provide Laptop interface (LO) connections at the locations shown on the floor plans. Provide Dual HDMI input connections at the wallplate. Provide Extron Model #DTP T HWP 4K 232 D wallplate for video and audio connections to the Digital Matrix Switch in the AV cabinet. Provide Extron Cat-X cable from the wallplates to the Matrix Switch in the AV Cabinet.
- 2.54 Contractor shall furnish and install the HDMI patch cords for the Laptop Input (LO) wallplate locations. Provide (1) HDMI patch cable for each of the (LO) wallplate connections. All patch cables shall be 12 feet in length at the Input wallplate locations. Refer to the Audio-Visual Patch Cables Section for requirements.
 - 2.54.1 Provide (1) HDMI to DisplayPort Adapter for the Input wallplate locations. The adapter shall be a female HDMI to Male DisplayPort dongle as manufactured by Dynex Model #DX-PD94502 (or Approved Equal).

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- 2.55 Provide Control Panel (shown as the symbol "LC") at the location shown on the drawings.
- 2.55.1 Provide Extron TLC PRO 1026M LCD Control Panel for Local Control (Symbol "LC" on drawings) location for control of the MPR Room AV and Sound Reinforcement System, at the location shown on the drawings. Program a Laptop PC provided by the District to show a quick link on screen for emulation of the TLC's control page functions. A Presenter shall be able to control input access from either the TLC Control Panel or the Laptop PC. TLC Control Panel shall be furnished in white.
- 2.55.2 Provide custom surface mounted bracket on the wall for the TLC Control Panel. The 27 20 00 Contractor shall furnish and install the custom bracket. Provide Extron Model #SMK 3 surface mount bracket kit for the TLC Control Panel. The surface mount bracket fits over the dual gang junction box in the wall. Refer to the manufacturer's recommendations for the size and depth of the junction box required
- 2.55.3 Provide selection pages for the each of the (2) Laptop Input Wallplates (both HDMI inputs on each wallplate), Wireless Wifi and Bluetooth Audio Streaming Receiver, Blu-Ray Player and MPR Room projector on the TLC control panel. Each of the input pages shall provide additional pages for full control of the device's features. Pages for the Wireless Wifi and Bluetooth Audio Streaming Receiver, Blu-Ray Player and Projector shall provide all control buttons such as play, stop, pause, search, etc., and shall emulate the controls available on the manufacturer's Remote Control provided with the equipment. The full functionality available through the control port on the device shall be emulated on the control panel.
- 2.55.3.1 Contractor shall provide all programming codes for the device controls. If the device is not already provided with the proper code from Extron, the Contractor shall contact Extron and place a service request to have the codes written. All costs associated with code development shall be the responsibility of the Contractor and shall be included in the bid costs. Programming codes shall allow for complete button functionality emulating the device's Remote Control.
- 2.55.4 Provide control buttons for operation of the projection screen. The screen shall also be programmed to automatically drop when the projector is turned on and close when the projector is powered down. The system may be operated without the screen or projector for audio only operation.
- 2.55.5 Control Panel shall also be provided with Control Pages for Presets based on the type of presentation function desired such as; Meetings, Presentations, Banquets, Background Music and Sound System Reinforcement, etc. Confirm all programming and labeling requirements with the District prior to installing the software changes on the Control Panel. All page designs and flow charts shall be submitted for approval to the Project Engineer and the District Project Manager prior to installation.
- 2.55.6 The Control Panel shall also be programmed to allow zoning control of the system speakers, based on the presentation function chosen. The speakers in the MPR Room shall be set up zoned separately from the Outdoor Amphitheater speakers. Pages shall be programmed to allow the MPR Room speakers to be used independently from the Outdoor Amphitheater speakers

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during presentation modes such as Presentation, Meeting, etc. based on input from the District. The Outdoor Amphitheater speakers shall be able to be toggled on/off for these presentation modes for overflow operation. In addition, One or Both Speaker Zones shall be able to be used for Audio Only playback. Volume control of the speakers shall be provided on the Control Panel.

- 2.55.7 The Control Panel shall provide RS-232 control of the Laser Projector, via the Matrix Switch, RS-232 Control of the Blu-Ray Player and Infrared (IR) control of the Wifi/Bluetooth Receiver.
 - 2.55.8 The "Main Projector" page on the control panel shall be furnished with full control of the inputs, focusing and zooming, and basic functions of the projector. Advanced control pages will not be required
 - 2.55.9 The integrated control processor in the Matrix Switch in the equipment cabinet shall be used for control of the system components. Connect the equipment to the Matrix Switch as shown in the Multipurpose Room Audio Visual diagram in the detail drawings
 - 2.55.10 Contractor shall download and provide the Wifi/Bluetooth Receiver's User APP and the Extron DSP User APP on the Control Panel. Provide additional User APPs as required by the District.
 - 2.55.11 The 27 20 00 Contractor will provide a Category-6 UTP cable to the TLC Control Panel from the Sound Cabinet location. Connect the Control Panel to a POE powered port on the data outlet and confirm that the port is activated at the Sound Cabinet Ethernet Switch. Coordinate the installation with the District IT Department for the IP Address functions.
- 2.56 Provide an HDMI/HDBT Audio-Visual Matrix Switch for distribution of the digital video and audio signals for the MPR Room.
- 2.56.1 Provide HDMI, DTP and/or Stereo Audio connections for the equipment in the AV Cabinet, as shown in the AV Wiring Diagram, to the matrix switch in the rack. Provide RS-232 or IR Control for all equipment from the Matrix Switch's IPCP integrated Controller. Route the RS-232 or IR control cabling from the Matrix Switch to the control port on the equipment.
 - 2.56.2 The switch shall be provided with HDMI, DTP and VGA video inputs and HDMI, HD Base-T and DTP video outputs, IP, IR and RS-232 controls and stereo amplifier.
 - 2.56.3 The AV Switch shall be provided with an Ethernet LAN connection from the Ethernet Switch in the Audio-Visual Cabinet. Provide Cat-6 patch cable from Ethernet Switch to AV Switch.
 - 2.56.4 Provide an Extron Cat-X cable from the Matrix switch's DTP output to the projector location. The cable connection shall be used to provide the HDMI video and RS-232 control from the projector to the Matrix Switch. The cable shall be terminated at the projector and connected to the DTP Receiver at the projector location. Terminate cable at the DTP Receiver.
 - 2.56.5 Provide Extron Cat-X cables from the Matrix switch's DTP Input Ports to the DTP Laptop wallplate locations. The cables shall be terminated at the

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- wallplate. Provide an Extron input wallplates at the local origination (LO) location shown on the floor plans.
- 2.56.6 Provide audio cables from the Wifi/Bluetooth Streaming Receiver and video and audio cables from the Blu-Ray Player in the Sound Cabinet to the Matrix Switch. The Matrix Switch shall serve as the main controller and router for the audio and video signals from the AV equipment.
- 2.56.7 The main balanced audio output from the AV Matrix Switch shall be routed to the Mixer in the AV Cabinet. Refer to the AV Diagram for additional requirements.
- 2.56.8 Provide the HDMI/DTP Scaling Matrix switch in the AV Cabinet by Extron IN1608 xi IPCP SA with LinkLicense. LinkLicense will be utilized for secondary control loaded and configured on the Contractor furnished Android Tablet.
- 2.57 Provide a DTP Receiver at the projector location for transmission of the video and control signals to the projector. Provide Extron DTP Receiver Model #DTP HDMI 4K 230RX. Power for the DTP Receiver shall be furnished from the AV Matrix Switch. Connect the HDMI output and RS-232 control port from the DTP Receiver to the projector. Contractor shall furnish and install the HDMI patch cable at the minimum length required. See Patch Cable section for patch cable requirements.
- 2.58 Provide a Blu-Ray Player mounted in the Sound Cabinet.
- 2.58.1 The Blu-ray Player's HDMI output shall be routed to the Matrix Switch as an input device. Provide HDMI patch cable, length as required, for the connection to the Matrix Switch and balanced audio output to Matrix Switch.
- 2.58.2 Provide RS-232 control of the Blu-Ray Player from the TLC Control Panel. Provide control cabling to the Control Panel from the Blu-ray Player.
- 2.58.3 Provide full control of the Blu-Ray Player from the TLC Control Panel and Tablet. Control Panel pages shall include full Internet Access options as well as basic functions such as Stop, Pause, Start and On/Off.
- 2.58.4 Provide a Category-6 UTP patch cable to the data outlet from the Blu-Ray Player for LAN and Internet access. Test Player to insure full functionality is attained and the Player can play back media as well as connect to the internet.
- 2.58.5 Provide a low-profile shelf in the AV Cabinet to hold the Blu-Ray Player. Provide shelf as manufactured by Middle Atlantic Model #UMS1-11.5 or approved equal. Strap the Player to the shelf with Velcro tie material.
- 2.58.6 Provide Blu-Ray Player as manufactured by Denon Model #DN500 DB MKII (Or Approved Equal).
- 2.59 Provide Ethernet switch in the Audio-Visual Rack exclusively for the AV system component connections. The audio-visual system components shall all be connected to the same switch unless otherwise noted on the drawings and wiring diagrams.
- 2.59.1 Managed Ethernet switch shall be provided with (8) 10/100/1000 POE network ports, with a minimum of (1) Uplink port and (7) POE+ powered ports. Each port shall have Gigabit Ethernet network connection capability. Switch shall be

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rack mounted in the back of the cabinet on a rack mounted adapter panel by the manufacturer. Contractor shall furnish and install rack mount panel. Provide Hewlett-Packard Model #J9982A OfficeConnect 1820 8G Ethernet switch with 65W POE+ capacity.

- 2.59.2 Provide Category-6 UTP patch cables as required to provide a full turn-key installation for the audio-visual system. See AV Wiring Diagram for additional requirements
- 2.60 All wall plates shall be the Extron Decora style for Audio/Video input locations. Provide a Decora trim ring as required at each location. Color of plates is to be confirmed by the Contractor prior to installation. Refer to the AV wiring diagram for input locations and wallplate requirements.
- 2.61 Contractor shall test all equipment for each system to insure proper operation with Laptop Computer Wallplates and all other input devices from the AV cabinet.
- 2.62 Tie the audio from all sources into the sound system rack and provide control for the audio inputs to work in conjunction with the video from the projector. Provide level control at the mixing board for the sources. Label clearly on mixing board and set up all programming for the Android Tablet Mixer controls.
- 2.63 Projector shall be Contractor Furnished and installed. Provide (1) projector and lens for the front projection system in the MPR Room. The projector shall be as manufactured by Epson, Model #Pro L1500WU with Standard Lens (based on estimated throw length required from location shown on floor plans). The projector shall be provided with all mounting systems and control systems. This projector shall also be furnished with a ceiling mounted support system to the building structure to allow for the projector to be properly lined up with the screen.
 - 2.63.1 Contractor shall refer to the drawing details for the installation requirements for the projector. The projector mount shall be provided with a Unistrut support system anchored to a minimum of (3) studs in the ceiling structure, or as required by the Structural Engineer and braced to the studs on the ceiling as shown in the details.
 - 2.63.2 The projector shall be furnished with the universal type projector mount recommended by the manufacturer installed on the 1-1/2" NPT adjustable mounting pole. Contractor to provide additional materials as required to allow for the proper alignment of the image. Refer to the drawing details for additional requirements.
 - 2.63.3 Detail drawings are intended to provide a minimum requirement for structural support and are to be used as a guideline. The Contractor shall be responsible for final design and installation of the projector structural support that shall meet at least the minimum requirements shown in the details. Contractor shall submit the installation details to the Project Engineer for approval prior to installation. The Contractor shall confirm the existing structural members that will be used for support of the projector and the projector mounting system.
 - 2.63.4 Provide heavy duty ceiling mounted projector pole mounted to the structural members of the building. Refer to the details for additional information on the projector installation and mounting requirements. Height of support shall depend on the height of the screen and the projector drop image requirements.

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- Provide heavy duty projector ceiling mount support plate as manufactured by Chief Manufacturing, Model #CMA115W. (or approved equal)
- 2.63.5 Contractor shall field verify lens option required for the application prior to ordering the projector and lens. If the installation throw distance is near the lens limit for the first lens shown or if the projector is relocated during construction, it may require moving to the next lens model.
- 2.63.6 Provide DTP Receiver at the projector location. Provide HDMI Receiver with audio and control outputs. Mount receiver to the 1-1/2" NPT mounting pole with the adapter mounting bracket by Extron Model #PMK 155. Match color of the bracket to the mounting pole. Refer to the AV Wiring Diagrams for the exact receiver configuration. The cable to the projector shall be dressed into the cable pathway on the projector mount.
- 2.63.6.1 Furnish and install a High Speed 90° Swivel-Type HDMI Patch Cable to the Projector from the DTP Receiver. Provide patch cable, in length required, to allow for connection to the Projector's HDMI Input ports. Refer to the patch cable section for the HDMI patch cable requirements. Patch cable shall be neatly dressed with Velcro ties.
- 2.63.7 Furnish an RS-232 cable from the DTP Receiver to the RS-232 Control port on the projector. Patch cable shall be neatly dressed with Velcro ties.
- 2.63.8 If the specified projector has been discontinued or out-of-production at the time of installation, the Contractor shall submit a viable alternative for approval by the Project Engineer, with a copy of the projector product cut sheets, image calculator and recommended lenses. The calculation must show the foot-lamberts brightness on the projection screen for the proposed replacement. Associated cost or change order requests shall be approved by the Project Engineer prior to ordering the proposed replacement.
- 2.63.9 Projector shall be furnished with a minimum (5) year warranty from the manufacturer. If the projector is not furnished with a warranty period of (5) years, the Contractor shall furnish the additional warranty coverage in the project to bring the warranty up to the required period.
- 2.63.10 Contractor shall field verify lens required for the application prior to ordering.
- 2.64 Provide electric front projection, tab tensioned screen in the soffit area where shown on the drawings. Contractor shall provide all hardware including, but not limited to, Unistrut, L-Brackets, beam clamps, hardware, support systems and brackets and design drawings of proposed mounting configuration. Detail drawings are intended to provide a minimum requirement for structural support and are to be used as a guideline. The Contractor shall be responsible for final design and installation of the projection screen structural support that shall meet at least the minimum requirements shown in the details. Contractor shall submit the installation details to the Project Engineer for approval prior to installation.
- 2.64.1 Coordinate the screen location with the installation of the projector. Screen shall be mounted to allow for the projector to be mounted with the proper image drop of the screen's usable image area. Screen must be aligned with projector to create the proper image size and orientation. The Projector's lens shift operation shall be employed for proper image alignment.

- 2.64.2 Mount screen to the soffit structural members. Refer to the detail drawings and Structural drawings for additional information on the structural reinforcement of the soffit area. Structural support for mounting of the screen shall be furnished and installed by the Contractor. The support of the screen requires a unistrut support system to be constructed and/or additional bracing members to be installed between the joists or framed members. Contractor to field verify the exact conditions prior to installation of the screen.
 - 2.64.3 Provide control of the new screen's low voltage control J-Box from the TLC Control Panel. Provide control relay wiring as shown in the AV Wiring Diagram.
 - 2.64.4 Draper Model "Ultimate Access V Series" projection screen, 87.5" High by 140" Wide by 165" Diagonal at 16:10 aspect ratio loaded with front projection screen surface by Draper Model "TechVision AH900X ALR" with a 0.9 Gain.
 - 2.64.5 Provide 3-12" quantity of black out drop at the top of the screen. Field verify dimensions and black-out requirements prior to ordering the new screen.
 - 2.64.6 Provide RS-232 module option for remote control of the screen from the TLC Control Panel. Provide cabling from the screen control module to Control Panel via the conduits shown on the floor plans. See the floor plans for further information. Provide the low voltage wall switch for control of the screen manually. Provide cabling from the control module to the manual screen control switch. The screen shall also be controlled from the TLC Control Panel and the Android APP. Provide programming and wiring connections to allow for screen up/down, on/off controls and pages from the TLC Control Panel.
 - 2.64.7 Provide 3-Button style low voltage wall switch option for control of the screen manually. Provide cabling from the internal control module to the manual control switch. The screen shall also be controlled from the TLC Control Panel. Provide programming and wiring connections to allow for screen up/down, on/off controls and pages from the TLC Control Panel. Provide 3-Button style wall switch for low voltage operation Draper Model #LVC-S.
 - 2.64.8 Contractor shall be responsible for coordinating all mounting requirements with the Project Structural Engineer and refer to the structural drawings for additional requirements.
- 2.65 Provide any additional items as shown on the A/V wiring details and diagrams

MPR Room Audio-Visual System Training

- 2.66 Contractor will provide a minimum of (8) clock hours of on-site training for site technical and Administrative/Teaching Staff on the MPR Room Sound Systems. Training for personnel shall be provided by certified Audio specialists. The scope of training shall encompass system operation and procedures. Technician training should include an integrated information overview, sound control procedures as well as operation procedures for all equipment in the sound rack. The contractor shall provide a detailed written outline clearly describing the proposed plan for all training, for approval by the Engineer and Owner's representative. Contractor shall submit at training schedule to the District to coordinate which District Technical staff shall be trained.
- 2.66.1 Training for Teaching and Administration Staff will include basic system concepts. Faculty and staff will need to know how to power on/off the system, control volume, access inputs, attach microphones, replace batteries, and test

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system for basic operations and all other operational requirements for daily use of the systems. Training should include use and operation of audio devices, techniques and troubleshooting tips. Trainers should incorporate hands-on techniques to maximize staff opportunity to incorporate into their curriculum that is both meaningful and targeted for their student needs. Clearly written support materials should be provided to all training participants. Manual describing operation and use of the system shall also be provided.

- 2.67 Contractor shall provide on-site AV training from Extron by an Extron trainer for the Technical staff covering all the Extron components in the system. All System Types - Contractor shall videotape at least (1) training session, in High Definition Video (1080p format), and save to a flash drive to turn over to the District. Training video shall be retained as property of the District.
- 2.68 Trainers shall provide Site or District Technicians with an in-depth technical overview of sound system equipment. Training should include basic overview of all equipment manuals and troubleshooting concepts. Site and District Technicians will be trained to provide setup, operation and application of sound systems. Technicians shall be instructed in the proper operation to replace all components of the sound systems. Clearly written documentation and support materials must be provided for each system. Provide support materials in a three-ring binder clearly for each system. A training manual describing operation and use of the system shall also be provided

Audio/Video Patch Cables

- 2.69 All patch cables must be factory manufactured. Cables may not be field modified or altered. Length of cable shall be as required by the specification section. If length is not specified, the cables shall be the nearest factory manufactured length above the minimum distance required.
- 2.69.1 **Audio Cable Assemblies 25-feet in length or less;** All 3.5mm stereo audio cable assemblies shall be a male to male cable fully shielded cable with 3.5mm bayonet style connectors. Extron Mini Audio Cables Series or equal. Provide minimum length of 6 feet.
- 2.69.2 **HDMI Patch Cables 3-feet in length or less;** All HDMI patch cables must be 4K verified and must conform to the HDMI High Speed cable standards. Patch cable shall be Extron HDMI Micro Series High Speed, ultra-flexible patch cables. Length of patch cable shall be either 3 feet or 1.5 feet as required for proper operation.
- 2.69.3 **HDMI Patch Cables 6-feet to 15-feet in length;** All HDMI patch cables must be 4K/30 verified and must conform to the Extron HDMI 4K Premium (6-12 feet) and Extron HDMI 4K High Speed (15 feet) ultra-flexible cable standards. Patch cables shall be Extron HDMI Ultra Series patch cables. Length of patch cable shall be as required for proper operation.
- 2.69.4 **HDMI Input Wallplate Cable Assemblies 12 feet in length;** All HDMI patch cables must be 4K/30 verified and must conform to the HDMI Premium and High Speed cable standards. Cables shall be furnished with 180o swivel head design, Vanco Pro Digital High Speed HDMI Swivel cable, UL and CL3 rated . Length of patch cable shall be 12' required for proper operation.
- 2.69.5 **HDMI Cable Assemblies 25-feet to 66-feet in length for Installation Connections;** All HDMI patch cables must be 4K/30 verified and must conform

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to the HDMI Premium and High Speed cable standards. HDMI cable assemblies must be a fiber optic/copper hybrid construction with detachable ends. Cables shall be Hall Research CHD-DE* 4K Javelin™ Active HDMI Cable w/Detachable Ends or Kramer CP-AOCH Series High Speed. Length of patch cable shall be as required for proper operation.

- 2.69.5.1 HDMI cable assembly must be installed with the manufacturer furnished “cable pulling sock”. Damaged or inoperable cable assemblies due to improper installation procedures shall be replaced by the Contractor at no expense to the District. Please note Manufacturer’s Cautionary Warning on product specification sheet – “DAMAGED DUE TO CONNECTOR BEING PULLED HARDER THAN 20 kg, IS NOT COVERED BY WARRANTY - To pull cable through conduits or tight spaces, never grab the connector, as it is easy to exceed the force limit on the connector, instead, remove the detachable end, protect the connector using a cable pulling sock and make sure the force is applied directly to the cable jacket.
- 2.69.6 **Category-6 Patch Cables 25-feet or Less;** Category-6 UTP patch cables shall be as manufactured by Leviton, Commscope or Ortronics. Patch cables shall be provided with standard patch cable material.
- 2.69.7 **Category-6 Patch Cables 25-feet or More;** Category-6 UTP patch cables shall be as manufactured by Leviton, Commscope or Ortronics. All patch cables in excess of 25-feet must be constructed with solid conductor wire to comply with the crosstalk requirements of the Category-6 standards.
- 2.69.8 ¼” TRS patch cables shall be as manufactured by Whirlwind TRS Cable Series (ST+) or approved equal.
- 2.69.9 Microphone or Monitor Return Channel XLR cables, 10-feet or greater in length, shall be constructed with Canare L4E6S cable, 95% braid, shielded cable assemblies. Provide Microphone cable assemblies as manufactured by Whirlwind, Model MKQ Quad (or Approved Equal). Exact lengths shall be as specified for each system
- 2.69.10 All patch cables shall be provided for each type of connection required to provide a complete and operational system. All patch cables shall be factory manufactured.

Portable Systems

- 2.70 Portable Equipment shall be furnished and spares supplied to the designated representative of the Client, along with complete documentation of the materials provided. Where applicable, deliver portable equipment in the original manufacturer’s supplied packaging.
- 2.71 Contractor shall furnish (1) Portable ADA Assistive Listening Systems Kit that may be used for Conference Rooms or other small meeting spaces. The portable system is currently designated for use in the New Relocatable Classroom.
 - 2.71.1 Provide for each Kit; A self-contained portable wireless FM transmitter and receivers inside a self-contained carrying case. Portable ADA Assistive Listening system shall be as manufactured by Williams Sound Corporation,

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Phone 1-800-843-3544. Provide self-contained FM based system Model #FM ADA Kit 37 RCH. System kit shall contain the following items;

- 2.71.1.1 (1) PPA T46 transmitter, (4) PPA R37 receivers, (4) HED 027 headphones, (1) MIC 090 Mini Lavalier microphone, (1) MIC 049 conference microphone, (1) CCS 029 carrying case, (1) NKL 001 neck loop receiver, (1) ADA wall plaque and (5) BAT 026-2 "AA" batteries.

PART 3 - INSTALLATION AND EXECUTION

- 3.1 Verify that all electrical requirements including junction boxes, empty conduit and power circuits and receptacles are in place as shown on the drawings.
- 3.2 Receive, check, unload, handle, store, and adequately protect equipment and materials to be installed as part of the contract. Store in areas as directed by the owner's representative. Include delivery, unloading, setting in place, fastening to walls, floors, ceilings, or other structures where required, interconnecting wiring of system components, equipment alignment and adjustment, and other related work whether or not expressly defined herein.
- 3.3 Installation practices shall follow "standard broadcast wiring" and installation practices, as excerpted from "Recommended Wiring Practices, "Sound System Engineering", (2nd Edition) D. Davis, and Performed to the highest standards of acknowledged industry practices. Upon request the A/V Contractor shall furnish all equipment and labor to verify the compliance with the following:

Optical:

- 3.3.1 Center to corner light fall off shall be less than 50% for video/data projectors.
- 3.3.2 Center to corner light fall off shall be less than 35% for optical projectors.
- 3.3.3 Images shall be level and square with the appropriate aspect ratio.
- 3.3.4 Image shall be free from visible vibration.

Audio System:

- 3.3.5 Signal-to-noise ratio (including crosstalk): 55-dB minimum.
- 3.3.6 Total harmonic distortion: 0.1% maximum from 30 Hz to 15,000 Hz.
- 3.3.7 System frequency response: ± 1.0 dB, 20 Hz to 20,000 Hz.
- 3.3.8 Program reproduction system with point-source loudspeakers: Flat response from 63 Hz to 2.5 kHz ± 2 -dB, decreasing uniformly from a relative level of 0-dB at 2.5 kHz to a relative level of -10 -dB at 10 kHz as measured on axis of loudspeaker.
- 3.3.9 Sound output capability: Program levels of not less than 100 dB without objectionable distortion, rattles, or buzzes.

- 3.3.10 Hum and noise is inaudible (below the background noise level of the space) under normal operation and as observed in normal seat locations.

Video System:

- 3.3.11 Signal-to-noise ratio (peak to RMS, unweighted DC to 4.2 MHz): 55-dB minimum.
- 3.3.12 Crosstalk (unweighted DC to 4.2 MHz): 45-dB minimum.
- 3.3.13 Frequency response: ± 0.5 dB to 4.2 Mhz.
- 3.3.14 Line and field tilt: 2% minimum.
- 3.3.15 Differential gain: 3% maximum.
- 3.3.16 Differential phase: 2% maximum.
- 3.3.17 System timing sync coincidence: within 50 nanoseconds.
- 3.3.18 Color timing: $\pm 2\%$ at 3.58 Mhz.

Radio Frequency (RF) System:

- 3.3.19 Visual Carrier level: +0 dBmV minimum and +16 dBmV maximum at system outlets for utilized channels.
 - 3.3.20 Adjacent Channel Visual Carrier: 3-dB maximum differential at system outlets.
 - 3.3.21 Non-adjacent Channel Visual Carrier: 0-dB maximum differential at system outlets.
 - 3.3.22 Carrier-to-Noise Ratio: 42-dB minimum
 - 3.3.23 Amplitude Response: Flat ± 1.0 Db
 - 3.3.24 Signal-to-Noise Ratio: 45-dB minimum for the maximum level of the signal and the interference resulting from cross modulation from other signals on the system, after demodulation.
 - 3.3.25 Outlet-to-Outlet Isolation: 25-dB minimum.
- 3.4 Adhere to manufacturer's published specifications for pulling tension, minimum bend radii, and sidewall pressure when installing cables.
 - 3.5 Where manufacturer does not provide bending radius information, minimum bending radius shall be 10 times cable diameter. Arrange and mount equipment and materials in a manner acceptable to the engineer and the owner.
 - 3.6 Attach cables to permanent structure with suitable attachments at intervals of 48 to 60 inches. Support cables installed above removable ceilings. Install adequate support structures for 10-foot cable service loops at each TC.
 - 3.7 Provide lacing bars for cable management in all of the sound systems cabinets. Contractor shall be responsible for providing neatly dressed cable bundles within the sound cabinet. Cables shall be dressed separately for Microphone and line level cables,

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speaker and monitor cables, control cables and power cables and video cables. All cables shall be neatly labeled with wrap around type written labels.

- 3.7.1 On the cable at the rear of the patch panel or termination 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 ACCEPTABLE EQUAL).
- 3.8 All faceplates shall be labeled with type-written permanent labels securely attached to the faceplates identifying all A/V connections. (ie; Doc Cam, PC, Audio Only, etc.) Cables at the projector and A/V switch shall be also be labeled to match the faceplates.
- 3.9 Group cables according to signals being carried. To reduce signal contamination, form separate groups for the following:
 - 3.9.1 Power cables.
 - 3.9.2 Control cables.
 - 3.9.3 Video cables.
 - 3.9.4 Camera cables.
 - 3.9.5 Audio cables for signals less than minus 20 dBm.
 - 3.9.6 Audio cables for signals between minus 20 dBm and plus 30 dBm.
 - 3.9.7 Audio cables for signals above plus 30 dBm.
 - 3.9.8 Broadband RF cables.
- 3.10 Run power cables, control cables, and high level cables on the left side of an equipment rack as viewed from the back. Run other cables on the right side of an equipment rack.
- 3.11 Cut cables (except video, camera and RGBS cables, which must be cut to electrical length) to the length required by the run. All wire and cable shall be continuous and splice-free for the entire length of run. For equipment mounted in drawers or on slides, provide the interconnecting cables with a service loop of appropriate length.
- 3.12 Install no cable with a bend radius less than that recommended by the manufacturer.
- 3.13 Provide strain relief for cables. Provide connectors with metal shell/casings. Provide a minimum of three feet of free cable coiled in a floor pocket. Use spiral wrap to group similar cable types.
- 3.14 All shielded cables shall be insulated. Do not permit shields to contact conduit, raceway, boxes, panels, or equipment enclosures. Tin all terminated shield drain wires and insulate with heat-shrink tubing.
- 3.15 Land all field loudspeaker wiring entering each rack at terminal devices prior to connection to equipment or devices. Land loudspeaker level control cables at screw or tubular clamp type barrier blocks on the left side of the equipment rack as viewed from the rear. Make all connections to screw-type barrier blocks with insulated crimp-on spade lugs. Size all lugs properly to assure low-resistance connections.

- 3.16 Separately dress, route and land microphone and line level cables directly to equipment.
- 3.17 Use only rosin core 60/40 tin/lead solder for all solder connections.
- 3.18 Lace, tie or harness wire or cable in accordance with accepted professional practice. Dress, lace or harness all wire and cable to prevent mechanical stress on electrical connections; no wire or cable shall be supported by a connection point. Provide service loops where harness of different classes cross or where hinged panels are to be interconnected.
- 3.19 Patch Panel Assignments: Wire patch panels so that signal "sources" (outputs from) appear on the upper row or a row pair and "loads" (input to) appear on the lower row of a row pair.
- 3.20 Patch Panel Designation Strips: Use alphanumeric identifications and descriptive information on patch panel designation strips. Number the jack positions in each horizontal row sequentially from left to right. Letter the horizontal jack rows sequentially from top to bottom. Include the alphanumeric identification of each jack on the functional block drawings, and on reproductions of these drawings that shall be mounted in an appropriate location near the patch bays.
- 3.21 Each major component of equipment shall have the manufacturer's name, address, model number, and rating on a plate securely affixed in a conspicuous place. NEMA code ratings, UL label, or other data which is die-stamped into the surface of the equipment shall be stamped in a location easily visible.
- 3.22 Upon completion of the work, remove all refuse and rubbish from and about the premises, and leave the relevant areas and equipment clean and in an operational state.
- 3.23 During the installation, and up to the date of final acceptance, protect finished and unfinished work against damage and loss. In the event of such damage or loss, replace or repair such work at no cost to the owner.
- 3.24 Prior to final acceptance, provide minimum of three complete sets of drawings showing all cable numbers and construction details in accordance with the actual system installation. Revise the device layout drawings to represent actual installation locations and coordinate these with the electrical Contractor. The operation manual shall contain all instructions necessary for the proper operation of the installed system and manufacturer's instructions. The maintenance manual shall contain all information required for the "proof of performance" as required and all manufacturers' maintenance information.

Inspection and Test upon Completion

- 3.25 Check out and final connections to the system shall be made by the Contractor of the products installed. Technicians shall demonstrate operation of the complete system and each major component to the Owner.
- 3.26 System field wiring diagrams shall be provided to the owner by the system Installer (Contractor) prior to completion of the installation.
- 3.27 All materials and installation shall be guaranteed to be free of defects in material and workmanship for two years after final acceptance of installation and test.

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- 3.28 Upon completion of the installation, four (4) copies of complete operational instructions shall be furnished, complete with record drawings. Instructions shall include part numbers and names, addresses, and telephone numbers of parts source. Final payment shall not be made until operational and maintenance manuals have been received.
- 3.29 The Contractor shall be responsible to provide service within 24 hours (or by mutual consent) after notification by the Owner or his representative, within the hours of 8:00 AM to 5:00 PM from Monday through Friday. Service request forms shall be supplied by the Contractor and the faxing or mailing of such a request form shall constitute notification by the Owner of a service request.
- 3.30 The Contractor shall provide two "preventative maintenance" service calls, spaced six months apart, for cleaning of all source devices and overall inspection of the system.

PROJECT CLOSEOUT

- 3.31 Prior to completion of project, compile a complete equipment maintenance manual for all equipment supplied under sections of this division, in accordance with these specifications and as described below.
- 3.32 Equipment Lists and Maintenance Manuals:
 - 3.32.1 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:
 - 3.32.1.1 Name, model, and manufacturer.
 - 3.32.1.2 Complete parts drawings and lists.
 - 3.32.1.3 Local supply for parts and replacement and telephone number.
 - 3.32.1.4 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.
- 3.33 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.

RECORD DRAWINGS

- 3.34 The Contractor shall maintain record drawings as specified in accordance with these specifications, and as noted below.
- 3.35 Drawings shall show locations of all concealed and exposed conduit runs, giving the number and size of conduit wires. Underground ducts shall be shown with cross section

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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 the actual changes made.

- 3.36 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 (2019 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 As-built AV Diagrams including wire and connection type, elevations of all AV Cabinets, quantities of mic outlets and speaker locations, locations of all final cable routes, including conduits. In addition, the drawings shall include all outlet locations with cable identification label information.

END OF SECTION 272000

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 - 2019. California Building Code (CBC), Part 2, Title 24, CCR.
 - CEC - 2019. California Electrical Code, (CEC), Part 3, Title 24, CCR.
 - CFC - 2019. 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-

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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 (2019).
- 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 (2019).
- 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 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.
 - 3.14.3 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.
 - 3.14.4 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 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:

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- 3.14.4.1 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.
 - 3.14.4.2 Provide a minimum of three (3) complete owner operation manuals for the District records.
 - 3.14.4.3 Provide a minimum of two (2) complete as built sets of drawings for the District records.
 - 3.14.4.4 Provide all spare parts as described in part 1 of these specifications
 - 3.14.4.5 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

LAKESIDE UNION SCHOOL DISTRICT

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

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. Final subgrade preparation for asphalt paving, Section 32 12 16 – Asphalt Paving.
 - 3. Aggregate base beneath asphalt paving is specified under Section 32 12 16 – Asphalt Paving.
 - 4. Excavation and Fill, Section 31 23 00 for Utilities and Storm Drains.
 - 5. Utility Storm Water Treatment, Section 33 44 19 (Architect to Verify).
 - 6. 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.

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.

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1.03 PERFORMANCE REQUIREMENTS

- A. All grading work shall be performed in accordance with 2019 CBC, Title 24, Part 2.
- B. Applicable General and Special Conditions of these specifications hereinafter set forth in full or by reference.

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 Lakeside 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

- 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,

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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.

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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, 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

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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.

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 recompact 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.
 - 4. Temporary Tree and Plan Protection, Section 01 56 39.

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.

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- F. Rocks or cobbles larger than 1 inch in diameter shall not be placed in the upper 12-inches of planting area fill, and rocks or cobbles larger than 3/4-inch shall not appear on the finish graded surface.
- 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.

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 31 16

TERMITE CONTROL

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Termite control as indicated on the Drawings and specified herein.
- B. Related Sections:
 - 1. Cast-in-Place Concrete, Section 03 30 00.

1.02 SUBMITTALS

- A. Submittals shall be made in accordance with Section 01 33 00.
- B. Submit plan showing how application of Termite Control will confirm to the EPA's Integrated Pest Management Guidelines and the School's guidelines for Pest Control Management.

1.03 GUARANTEE

- A. Upon completion of the termite control work, and as a condition of final acceptance, submit a written guarantee to the Owner providing:
 - 1. That the application was made at the concentration, rates and methods in compliance with this specification.
 - 2. That the effectiveness of the treatment is guaranteed for a term of five (5) years.
 - 3. That evidence of subterranean termite activity or damage to the structure resulting from such activity within the guarantee period will be treated and repaired at no cost to the Owner.
 - 4. Guarantee shall comply with Section 01 78 30 – Warranties, Guarantees, and Bonds.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Apply one of the following chemicals as a water emulsion at not less than the concentration and volumes designated on chemical container label. Strictly follow chemical mixing, use in handling, directions and environmental cautions stated on product label:
 - 1. Permethrin
 - 2. Cypermethrin
 - 3. Fenvalerate

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- B. If combination of these toxicants is used, at least one must be applied at not less than the percentage designated.
- C. Proprietary formulas may be used providing they contain one or more of the above named chemicals in at least the concentration specified and is registered with the Environmental Protection Agency and the California Department of Food and Agriculture, and the label sets forth the names and percents of active ingredients of the formula. A copy of this registration and formula shall be submitted for review.
- D. The materials shall be delivered to the project site in the original sealed and labeled containers of the manufacturer.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Sufficient notice shall be given to permit application to be made at least twelve (12) hours prior to concrete placement. To avoid surface flow of the toxicant from the application site, treatment shall not be made when soil or fill is excessively wet. Apply only after preparation for concrete placement has been completed. There shall be no disturbance of treated areas.
- B. Horizontal Barriers: Make application under the entire surface of slabs-on-grade (except sidewalks) as on overall treatment of not less than 100 gallons (over ABC fill) or 150 gallons (over crushed rock fill) per 1,000 square feet. Treat sidewalks, entrance platforms and other slabs abutting the building for an area not less than three (3) feet wide adjacent to the building.
- C. Vertical Barriers: Apply at the rate of four (4) gallons per 10 linear feet as follows:
 - 1. Along the interior side of foundation walls.
 - 2. Along the exterior side of foundation walls where floors, entrances, sidewalks, etc., will abut the building.
 - 3. Along expansion or cold joints.
 - 4. Wherever slab will be penetrated by construction features.

3.02 PROTECTION

- A. Safety Precautions: Notify on-site work persons that a toxic material is going to be applied and that work in or adjacent to the involved area may be hazardous to their health.

END OF SECTION

32 00 00

EXTERIOR IMPROVEMENTS

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SECTION 32 12 16

ASPHALT PAVING AND AGGREGATE BASE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Asphaltic concrete paving as indicated on the Drawings and specified herein.

- B. Principal items of Work:
 - 1. Preparation of subgrade
 - 2. Soil sterilization
 - 3. Aggregate base course
 - 4. Asphaltic surfacing materials
 - 5. Mixing asphaltic concrete material
 - 6. Placing asphaltic concrete pavement
 - 7. Flood test

- C. Related Sections:
 - 1. Utility Storm Water Treatment, Section 33 44 19.
 - 2. Earth subgrade preparation for asphaltic paving: Section 31 20 00 – Earth Moving.
 - 3. Storm Utility Water Drains, Section 33 44 00.
 - 4. Painting and Coating, Section 09 90 00.

1.02 PERFORMANCE REQUIREMENTS

- A. Establishment of Grades:
 - 1. The Contractor shall be responsible for finished elevation grade stakes and other surveying necessary for the layout of the Work.
 - 2. Conduct operations in such a manner that the survey stakes shall be protected as long as their need exists. Be responsible for replacement of stakes.
 - 3. Areas having drainage gradients of 2% or more shall have elevation stakes, set with instrument, at grid intervals of 25 feet. Intermediate stakes may be set by using a tightly-drawn string line over the tops of adjacent stakes. Grade stakes must be set at all grade breaks, grade changes, etc.
 - 4. Areas having drainage gradients of less than 2 percent shall have elevation stakes, set with instrument, at 10 foot intervals. Grade stakes must be set at all grade breaks, grade changes, etc.

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1.03 SUBMITTALS:

- A. Provide the following:
 - 1. Material Compliance Data Specifications.
 - 2. Material Safety Data Specifications.
 - 3. Copy of Installer's license.
 - 4. Sterilization application data and purchase receipt.
 - 5. Sample of aggregate for testing, if requested by engineer.
 - 6. Data Sheets for seal coat and paint.

1.04 QUALITY CONTROL SUBMITTALS

- A. Testing and Control of Materials:
 - 1. Material shall meet the requirements specified herein. Laboratory tests of all of the materials will be required. If such tests meet the specified requirements, the laboratory test fees shall be paid by the Owner. If cost of subsequent tests fail to meet specified requirements, the costs of such tests shall be paid by the Contractor, and the Contractor shall immediately rectify the deficiency. Refer to Section 01 45 23 – Testing and Inspecting Services.
 - 2. The Owner's inspector shall test the temperature of each batch of asphaltic concrete prior to placement. If asphaltic concrete temperature is not within tolerances as set forth in this Section of the Specifications the affected batch shall be rejected. Any and all costs due to the rejected asphaltic concrete shall be the responsibility of the paving contractor.

1.05 PROJECT SITE CONDITIONS

- A. Protect existing installations: Such installations, which are shown on the plan or whose location could be reasonably inferred and which become damaged or broken by the operations, shall be repaired or replaced at no cost to Owner.

PART 2 - MATERIALS

2.01 MATERIALS

- A. Soil Sterilization: The soils sterilant shall be in accordance with current EPA acceptable standard and the California Department of Pesticide Regulations for soils sterilant. Sterilant shall be selected as appropriate for the environment in which it is to be placed. Contractor shall be licensed with the State of California to apply sterilant.
 - 1. Sterilant shall be commercial grade for commercial application. Contractor may obtain a list of acceptable sterilants from the District prior to bidding project.
- B. Base and Aggregate Base:
 - 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. Base depth shall be in accordance with plans and specifications. If no depth is specified, the minimum depth shall be 4".
- C. Asphalt Concrete: Shall be produced by a commercial asphalt paving plant. Mineral aggregate and asphalt concrete production shall be in compliance with the State of California, Department of Transportation (CALTRANS) Standard Specifications, Current Edition.
1. Paving asphalt shall be per CALTRANS Section 39 Hot Mix Asphalt.
 2. All on site paving shall be PG-64, ½" maximum Medium Grade asphalt per CALTRANS, Section 92, unless otherwise specified by the geotechnical engineer.
- D. Asphalt Sealer: Sealer shall be LAS-320 by Enviroseal Corporation, 800-775-9474, or equal. Sealer cannot be installed for a minimum of 30 to 45 days after asphalt has been completed. Contractor shall account for this in his schedule. If asphalt must be striped prior to sealer, contractor shall account for sealer application and a subsequent restripe of any striping obscured by sealer.
- E. All stripes and markings shall be painted with two (2) coats of pavement parking paint, v.o.c. compliant, lead free, base acrylic copolymer TSP, TT-P-115F, Type I and TT-P-85E for parking lots (yellow and white); and regular dry waterborne traffic paint (red, yellow and blue), TT-P-1952B for curbs, fire lanes, accessible striping, etc. Paint curb red at fire lanes - refer to the Fire Access Site Plan. Asphaltic concrete seal coat shall be in place a minimum of 10 days before applying paint.
1. Apply parking stall lines as indicated on the Drawings. Parking stall lines shall be 3 inches wide and white in color. Edges shall be clean and sharp.
 2. Accessible Parking Stalls: Parking Spaces for persons with disabilities to be marked according to CBC Sections 11B-208, and 11B-502.
 3. 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 white to contrast with the parking surface. CBC Figures 11B-502.2, 11B-502.3, 11B-502.3.3, and 11B-503.3, Blue color shall conform to Color No. 15092 per Federal Standard 595B. Paint to be slip resistant and provide a minimum 0.6 static coefficient of friction. Refer to drawings for width of painted lines and markings on pavement (3" minimum).
- F. Application of Tack Coat
1. Apply tack coat at a rate of 0.05 to 0.15 gallon per square foot to cleaned contact surfaces of previously placed asphaltic concrete, abutting or projecting into asphaltic concrete paving and face of concrete curbs and walks. Protect exposed concrete.

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- G. Detectable Warning Area Tile: Terra Paving, ADA-3 Truncated Domes, 12 inch by 12 inch, or Armor-Tile, truncated vitrified polymer dome tiles, as distributed by White-Cap Construction Supply, CBC, 2019, Title 24, Part 2, Section 11B-705.1.2.5
1. Detectable Warnings, CBC, 2019, Title 24, Part 2, Section 11B-705.1.2.5:
 - a. Square grid, in-line pattern:
 - b. Diameter of nominal 0.9 inch (22.9mm) at base tapering to 0.45 inch (11.4) at top.
 - c. Nominal height of 0.2 (5.08 mm) inch.
 - d. Nominal center to center spacing of 2.35 (59.7 mm).
 - e. Color "yellow" conforming to Federal Color No. 33538 per Standard No. 595B. CBC Sections 11B-705.1.2.5 and 11B-810.5.2.
 2. Provide a written five (5) year product warranty provided by the manufacturer of detectable warnings and directional surface products as equivalent to the evaluation and product approval program. Such warranty shall indicate compliance with architectural standards as published in the current edition of the California Building Standards Code, and also include durability criteria which indicates that the shape, color fastness, confirmation, sound-on-cane acoustic quality, resilience, and attachment will not degrade significantly for at least five (5) years after initial installation. Warranty will certify that the produce will not degrade significantly, meaning that the product maintains at least 90 percent of its approved design characteristics, as determined by the enforcing agency.
- H. Concrete Wheel Stops
1. Provide concrete wheel stops by San Diego Precast, or equal. Concrete shall be 4000 psi in 28 days. Provide two be galvanized dowels as anchorage, and glue wheel stop to asphalt surface. Dowels shall be hot dipped galvanized, 16-inch long, #4 reinforcing. Recess head of dowel beneath the top of the wheel stop. Wheel Stop shall be a minimum length of 6-feet.

PART 3 - EXECUTION

3.01 FINAL PREPARATION OF SUBGRADE

- A. Immediately prior to placing base or aggregate base, the subgrade shall be scarified to a depth of at least 12 inches, moistened, and the entire area thoroughly compacted by rolling to obtain a smooth, hard, even surface of 95 percent compaction at bus drop off and fire lane and 90 percent compaction elsewhere to receive the base or aggregate base. The subgrade shall be finished to the required grades with due allowance being made for the thickness of base course and finished surfacing to be placed thereon.
- B. Subgrade for the pavement structures shall not vary more than ± 0.04 feet from the specified grade and cross section.
- C. Areas inaccessible to power rolling or areas that cannot be compacted properly with power rollers shall be compacted with vibrating compactors or other suitable mechanical means which shall produce a firm foundation for the paving structure.

3.02 SOIL STERILIZATION

- A. The Contractor shall take whatever precautions are necessary to prevent contamination of adjacent soil areas with sterilant and for the protection of personnel. Sterilant shall not be applied within two feet of planting areas.
- B. Certification shall be furnished to the Architect, showing the purchase receipt and rate of application of the material. Payment for soil sterilization will include full compensation for application and all materials and incidental work required.

3.03 AGGREGATE BASE OR BASE

- A. The base material shall be placed upon the finished subgrade after the subgrade has been properly prepared as herein specified. The base shall be placed in accordance with CALTRANS, Section 26.

3.04 DEFINITIONS

- A. For the purpose of compacting procedures the following definitions are used:
 - 1. Initial or Breakdown Rolling: The first coverage of a roller on asphalt concrete after the material has been placed to line and grade.
 - 2. Intermediate Rolling: The rolling performed immediately after the initial rolling. When completed, the pavement should meet job density requirements.
 - 3. Compaction Rolling: Including initial and intermediate rolling.
 - 4. Finish Rolling: The final rolling necessary to obtain the desired surface texture and eliminate roller marks. No further densification is anticipated in this operation.
 - 5. Coverage: The number of movements of a roller required to cover the entire width being paved at least once.
 - 6. Steel-Wheel Roller: A 2-wheel steel tandem roller weighing 8 to 10 tons.
 - 7. Pneumatic-tired Roller: A rubber-tired roller equipped with tires a minimum 7.50 x 15 in size, capable of being ballasted up to 12 tons.
 - 8. Vibratory Roller: A vibratory roller capable of imparting a dynamic force of at least 21,000 pounds.
 - 9. Maximum Laboratory Density: Density achieved on a sample of a material taken from a specific location at the job site under working conditions. This density can be obtained using the California Kneading Compactor per Test Method No. Cal. 304.
- B. Prior to paving, furnish manufacturer's certificates or literature demonstrating that rollers meet requirements specified above. Prior to paving, state which procedure will be used and do not change that procedure without the Engineer's approval.

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3.05 PRIMARY LIFT SPREADING AND COMPACTION

- A. Asphalt concrete in excess of 2 inches in thickness, shall be placed in two (2) lifts, a primary lift, and a surface course. Surface Course shall be a minimum of 1 inch thick.
- B. Asphalt concrete shall be delivered to the project site at a temperature of not less than 260 degrees F. nor more than 320 degrees F.
- C. The depositing, distributing, and spreading of asphalt concrete shall be accomplished in a single, continuous operation by means of a self-propelled paving machine, motor grader, spreader box, rock spreader, or similar equipment.
- D. Prior to spreading, a tack coat shall be applied to the vertical face of all curbs, gutters, and structures which will butt against the new pavement. A tack coat is required between courses if surface has been contaminated by dirt or oxidized by extended exposure. A diluted SS-type emulsion shall be used for tack coat and shall meet the requirements set forth in CALTRANS, Section 39 and Section 94.
- E. Certification: Provide certification that the asphalt aggregate mixture has at least 80 percent of compacted density values equal to or greater than 96 percent - and 100 percent equal to or greater than 95 percent - of a laboratory specimen prepared by the appropriate test method from a sample taken from a truck delivering mixture to the job site. Field density of compacted asphalt concrete shall be determined by:
 - 1. A properly calibrated nuclear asphalt testing device in the field, or
 - 2. ASTM D1188 when slabs or cores are taken for laboratory testing. Zinc stearate may be substituted for paraffin.
 - 3. In case of dispute, the procedure described under Sub-Item E (2.) above shall be used. Combination of rollers shall be allowed under this procedure.
- F. Steel-Wheel and Pneumatic: Apply a breakdown (initial) coverage with a steel-wheel roller loaded to 10 tons. Follow by intermediate rolling consisting of a minimum of 6 coverages of a pneumatic-tired roller, the tires being inflated a minimum of 60 psi cold and a maximum of 90 psi when hot. Finish rolling may consist of one coverage of an 8-ton tandem steel-wheel roller.
- G. Steel Wheel: Apply a minimum of eight coverages with a steel-wheel roller loaded to 10 tons.
- H. Vibratory: Compaction shall consist of at least six coverages with a vibratory roller. Rolling from the center to the edge shall be permitted, and all compaction rolling shall be accomplished before the mix temperature falls below 185 degrees F. Rolling shall commence at least one foot from edge of the mat after which the roller shall be gradually advanced to the edges. Within one foot of edge, the roller on its initial coverage shall advance to the edge in 4-inch increments. The roller shall be advanced to a supported edge first, if applicable. Rolling within one foot of an unsupported edge should be delayed to minimize possible distortion but completed at such time that proper densities are obtained after the completion of rolling. No roller shall be permitted to stand motionless on portion of the work before it has been properly compacted.

3.06 SURFACE COURSE SPREADING AND COMPACTION

- A. Surface course shall be 1-inch thick.
- B. At the time of delivery to the site of work, the temperature of mixture shall not be lower than 260 degrees F., or higher than 320 degrees F. Asphalt concrete shall not be placed when the atmospheric temperature is below 40 degrees F. or during unsuitable weather.
- C. The asphalt concrete shall be evenly spread upon the subgrade or base to such a depth that after rolling, it shall be of the specified cross section and grade of the course being constructed.
- D. The depositing, distributing, and spreading of the asphalt concrete shall be accomplished in a single, continuous operation by means of a self-propelled mechanical spreading and finishing machine designed especially for that purpose and equipped with a screed or strike-off assembly capable of being accurately regulated and adjusted to distribute a layer of the material to a definite predetermined thickness.
- E. Spreading, once commenced, must be continued without interruption. No greater amount of the mixture shall be delivered in one day than can be properly distributed and rolled during that day.
- F. Compaction is the same as outlined in Paragraph 3.05, except as noted below:
 - 1. Steel-Wheel and Pneumatic: Apply a breakdown (initial) coverage with a steel-wheel roller loaded to 10 tons. Follow by intermediate rolling consisting of a minimum of four coverages of a pneumatic-tired roller, the tires being inflated a minimum of 60 psi cold and maximum of 90 psi when hot. Finish rolling may consist of one coverage of an 8-ton tandem steel-wheel roller.
 - 2. Steel-Wheel: Apply a minimum of six coverages with a steel-wheel roller loaded to 10 tons.
 - 3. Vibratory: Compaction shall consist of at least four coverages with a vibratory roller.
- G. As soon as the layer of asphalt concrete has been placed, it shall be thoroughly compacted by rolling. Rolling shall be commenced along the lower edge of the area to be rolled and shall be continued until the edge is thoroughly compacted, after which the roller shall be gradually advanced to the crown point, both sides being rolled in a like manner. Rolling shall be continued until the layer has become thoroughly compacted throughout and is true to grade and cross-section.
- H. Maintain rollers in good mechanical condition, and those that cannot be operated without jerking, or driven along a straight path, shall not be used. No leakage of petroleum products from roller shall be allowed to come in contact with the pavements being constructed, nor shall roller be permitted to stand motionless on portion of the work before it has been properly compacted.

Rolling surfaces shall be treated with water to prevent the adherence of the asphalt concrete, but the quantity used must not be such as to be detrimental to the surface being rolled.

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3.07 FLOOD TESTING

- A. Flood Test: Before seal coat is applied, a water flood test shall be done in the presence of the Inspector. The flooding shall be done by water tank truck. Depressions where the water ponds to a depth of more than 1/8-inch shall be filled, or the slope corrected to provide proper drainage. The edges of the fill shall be feathered and smoothed so that the joint between the fill and the original surface is invisible.

- B. Seal Coat: After completing the flood test and the pavement has cured for 30 days, all new A.C. pavement shall receive a slurry sealer applied in accordance with the manufacturer's specifications.
 - 1. Areas to receive sealer shall be swept clean, and, before application, lightly sprayed with water, leaving it cool and damp but free of excess water.
 - 2. Make two or more applications using a total of at least 80 square foot/gallon, min.
 - 3. Each coat of sealer shall dry 24 hours before the succeeding coat is applied.
 - 4. The finished surface seal, when dry and thoroughly set, shall be smooth, tough, waterproof, resilient, of uniform black color, and free from coarse textured areas, lap marks, ridges, and other surface irregularities. Should defect appear in the finished surface, apply as many additional coats of sealer as may be required to produce the specified finished surface at no additional cost. Protect from traffic during all operations and until the sealer is thoroughly set and cured and does not pick up under foot or wheeled traffic – min. of 24 hours. When cured and set, thoroughly wash off with water to remove excess residue before applying painted markings.
 - 5. Application shall be by spray method is possible. Brush method may be used when sealer is covering existing pavement and the pavement is in poor condition. Skid-slip resistance applications using sand are not acceptable.
 - 6. Repair any damage caused by construction traffic.

3.08 PAVEMENT MARKINGS

- A. Accessible Parking:
 - 1. Accessible parking spaces serving a particular building or facility shall be located on the shortest accessible route to an entrance complying with CBC Section 11B-208.3.1.
 - 2. Accessible parking spaces serving more than one accessible entrance shall be dispersed and located on the shortest accessible route to the accessible entrances.
 - 3. Accessible parking spaces in a parking facility not serving a particular building or facility shall be located on the shortest accessible route to an accessible pedestrian entrance of the parking facility. CBC Section 11B-208.3.1
 - 4. Minimum number of required accessible parking spaces shall be provided in accordance with CBC Table 11B-208.2 for each parking facility provided on a site.

5. For every six or fraction of six accessible parking spaces, at least one shall be an accessible van parking space. CBC Section 11B-208.2.4
 6. Accessible parking spaces and access aisles shall comply with CBC Section 11B-502 and shall be dimensioned to the centerline of the marked lines as follows:
 - a. Parking spaces and access aisles shall be marked according to CBC Figures 11B-502.2, 11B-502.3, and 11B-502.3.3. Their surfaces shall comply with CBC Section 11B-302 and shall be at the same level with slopes not steeper than 1:48 in any direction. CBC Section 11B-502.4
 - b. Parking spaces shall be 9'x18' minimum and van parking spaces shall be 12'x18' minimum with an adjacent access aisle of 5'x18' minimum. Access aisles shall be placed on either side of the parking spaces except be located on the passenger side for van parking spaces. Van parking spaces shall be permitted to be 9'x18' minimum where the access aisle is 8'x18' minimum.
 - c. Access aisles shall be marked by a blue painted borderline around their perimeter. The area within the blue borderlines shall be marked with hatched lines a maximum of 36" on center in a color contrasting with that of the aisle surface, preferably blue or white. Access aisle markings may extend beyond the minimum required length. CBC Section 11B-502.3.3
 - d. Access aisles (accessible parking spaces as well – similar application) shall not overlap the vehicular way. CBC Section 11B-502.3.4
 - e. A vertical clearance of 8'-2" minimum shall be provided for accessible parking spaces, access aisles, and vehicular routes serving them. CBC Section 11B-502.5.
- B. Passenger Drop-off and Loading Zones:
1. At least one passenger loading zone shall be provided in every continuous 100 linear feet of loading zone space, or fraction thereof, complying with CBC Sections 11B-209 and 11B-503 as follows:
 - a. Vehicle pull-up spaces shall be 8' x 20' minimum.
 - b. Access aisles shall be 5' wide minimum x full length of vehicle pull-up spaces they serve and shall be adjacent and parallel to the vehicle pull-up spaces. They shall be at the same level with each other and with slopes not steeper than 1:48 in any direction. Access aisle shall adjoin an accessible route and shall not overlap the vehicular way.
 - c. Access aisles for passenger drop-off and loading zone shall be marked with a painted borderline around their perimeter. The area within the borderlines shall be marked with hatched lines a maximum of 36" on center in a color contrasting with that of the aisle surface. (Blue interior hatch lines are preferred for concrete surfaces and white interior hatch lines are preferred for asphalt surfaces. Where white hatch lines are used, hatch lines shall be interrupted at 12" high 'No Parking' text so that legibility is maintained.) CBC Section 11B-503.3.3

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- C. Pavement Marking Paint: Vinyl acrylic type for use on asphaltic concrete and Portland cement concrete. Painted lines and markings on pavement shall be 3" minimum wide and blue in color equal to Color No 15092 per Federal Standard 595B. Refer to Paragraph 2.01 D., for additional paint striping information.
- D. Provide International Symbol of Accessibility for each accessible parking stall at location indicated in the Drawings. Symbol shall be 36 inches square, white on standard blue background, and ADA Accessibility Guidelines for Buildings and Facilities.
 - 1. Parking spaces for the disabled shall be marked according to CBC Sections 11B-208, and 11B-502.
 - 2. Refer to paragraph 2.01 D., for additional paint striping information.
- E. Preparation:
 - 1. Immediately before applying the paint, thoroughly clean the pavement surface of dust, dirt, sand, scale, water, oil, grease or other objectionable matter. Do not use solvent materials that will damage pavements as cleaning agent. Immediately before paint, give pavement surface a final cleaning by means of a power broom. Following the power brooming, use power blower containing compressed air.
 - 2. Provide warning devices required to protect the painting operations and the finished work.
- F. Application: Immediately following other preparation of the pavement surface, apply the striping at the rate of 100 to 110 square feet, per gallon of paint. Apply lines 4 inches wide unless otherwise indicated. Apply the stripe of the indicated or specified width with clean true edges and without sharp breaks. Repaint to the applicable specification portions of the stripe damaged by any type of traffic within 24 hours after the stripe has been applied.
- G. Provide temporary striping where parking must be occupied prior to installation of seal coat.

3.09 CLEANUP

- A. Clean up the paved areas prior to acceptance of the work. Dirt, spoil, and debris of nature shall be removed, and the entire site shall present a clean, workmanlike appearance.
- B. Damage to paint work from paving or seal-coating operations shall be corrected.

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, 2016, 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 alkalies.
 - 1. 3/4" for Curb and Gutter
 - 2. 3/4" for Broom Finish
 - 3. 3/8" for sandblasted on other exposed aggregates

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- 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 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," 1/2-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.
- 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 2016 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 2016 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 20163, 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

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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. 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

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

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follow.

- 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 ½".
- 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 ½" 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

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underground piping. This must be witnessed by the project inspector.

- 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

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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 equipment may have damaged or affected the required watertight integrity of the pipe,

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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 11B-302.3. 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 **Lakeside 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/wgo2009_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.

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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

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- 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